International Healthcare Accreditation: an Analysis of Clinical Quality and Patient Experience in the UAE

Subashnie Devkaran,
FACHE, MScHCM, BSc (Physiotherapy), CPHQ,

Edinburgh Business School,
Heriot-Watt University

Submitted for the degree of Doctor of Philosophy
April 2014

ABSTRACT

A mixed method research design was used to answer the question; 'does accreditation have an impact on hospital quality, clinical measures and patient experience?' The thesis contains three study components: 1) A case study determining the predictors of patient experience; 2) a cross-sectional study examining the relationship of hospital accreditation and patient experience and 3) A four year time series analysis of the impact of accreditation on hospital quality using 27 quality measures.

A case study analysis of patient experience, using a piloted, validated and reliable survey tool, was conducted in Al Noor Hospital. The survey was administered via face-to-face interviews to 391 patients. Patient demographic variables, stay characteristics and patient experience constructs were tested against five patient experience outcome measures using regression analysis. The predictors of positive patient experience were the patient demographics (age, nationality, and health status), hospital stay characteristics (length of stay and hospital treatment outcome) and patient experience constructs (care from nurses, care from doctors, cleanliness, pain management and quality of food). Recommendations were made on how hospital managers can improve patient experience using these modifiable factors.

The cross-sectional study found that accredited hospitals had significantly higher inpatient experience scores than non-accredited hospitals. The hospital level variables, other than patient volume, had no correlations with patient experience.

The interrupted time series analysis demonstrated that although accreditation improved the quality performance of the hospital with a residual benefit of 20 percentage points above the baseline level, this improvement was not sustained over the 3-year accreditation cycle. The accreditation life cycle theory was developed as an explanatory framework for the pattern of performance during the accreditation cycle. This theory was consequently supported by empirical evidence. Recommendations were made for improvement of the accreditation process. The Life Cycle Model and time series analysis were proposed as strategic tools for healthcare managers to recognise and prevent the negative trends of the accreditation life cycle in order to sustain improvements gained from accreditation.

The findings of the three research components were triangulated to form a theory on the impact of accreditation on clinical quality measures and patient experience. This thesis is important from a research perspective, as healthcare accreditation, although commonly used to improve quality, is still under researched and under theorised. This is the first investigation of accreditation to use interrupted time series analysis, the first analysis on patient experience and hospital accreditation and also the first study on patient experience in the Middle East. Thus it adds to the evidence base of accreditation and patient experience but also has policy and management implications.

DEDICATION

To my mother who provided me with a strong foundation on which to rise and constant support throughout my life.

To my children, Nikira and Nikyle, who are my inspiration and truly the wind beneath my wings.

ACKNOWLEDGEMENTS

"*Intelligence plus character-that is the goal of true education*." -Martin Luther King Jr. This doctoral thesis has stimulated the developement of these fundamentals, which would not have been possible without the invaluable support and assistance of several individuals. Firstly, I am fervently grateful to my supervisor, mentor and respected friend, Professor Patrick O'Farrell, whose discussion, wisdom, critique, precious insight and professional guidance imbued me to pursue rigor, critical thinking and the evolution of innovative ideas and perspectives. His inspiring and encouraging disposition guided me to a deeper understanding of the knowledge base. I am truly blessed to have met and worked with such a phenomenal individual. I have relished this journey because of our partnership. He has touched my life and changed it for the better by personifying the adage, *"The task of the modern educator is not to cut down jungles, but to irrigate deserts.*"- C.S. Lewis.

Secondly, I am truly indebted to my wonderful family and feel fortunate to have them in my life. I am grateful to my amazing mother, Sabitha, whose constant support never wavered. Her calm reassurance, valuable insights and positivity gave me the strength to continue till the end. This thesis would not have been possible without her. She is the best mother anyone could wish for. My lovely children, Nikira and Nikyle, were absolute angels. Their patience and willingness for me to succeed motivated me. They always put things in perspective, made me laugh, inspired me and made me feel like the luckiest mom in the world. I love you all! I thank my understanding husband, Jaishen, who supported me from start to finish and came to appreciate the learning that goes into a doctoral degree. I am grateful to my father, Roland, who always believed that I could achieve this and provided constant support. I am appreciative of the leadership at Al Noor Hospital, Airport Road and the Quality Department for their support and encouragement throughout the thesis, specifically, Dr. Peter Hill, Randy Arcangel, Bryan Abrero, Dr. Sara Alom and Dr. Taha Ibrahim.

I would also like to express my sincere gratitude to all the Examiners (chiefly Professor Alex Scott and Professor Ciarán O'Boyle) and the Research Committee. Their assistance and support is acknowledged and deeply appreciated.

Subashnie Devkaran

DECLARATION STATEMENT

ACADEMIC REGISTRY
Research Thesis Submission

Name:	**SUBASHNIE DEVKARAN**		
School/PGI:	**EDINBURGH BUSINESS SCHOOL**		
Version: *(i.e. First, Resubmission, Final)*	**FINAL**	Degree Sought (Award **and** Subject area)	**Doctor of Philosophy (Ph.D)**

Declaration

In accordance with the appropriate regulations I hereby submit my thesis and I declare that:

1) the thesis embodies the results of my own work and has been composed by myself
2) where appropriate, I have made acknowledgement of the work of others and have made reference to work carried out in collaboration with other persons
3) the thesis is the correct version of the thesis for submission and is the same version as any electronic versions submitted*.
4) my thesis for the award referred to, deposited in the Heriot-Watt University Library, should be made available for loan or photocopying and be available via the Institutional Repository, subject to such conditions as the Librarian may require
5) I understand that as a student of the University I am required to abide by the Regulations of the University and to conform to its discipline.

* *Please note that it is the responsibility of the candidate to ensure that the correct version of the thesis is submitted.*

Signature of Candidate:		Date:	**27TH APRIL 2014**

Submission

Submitted By *(name in capitals)*:	**SUBASHNIE DEVKARAN**
Signature of Individual Submitting:	
Date Submitted:	**27TH APRIL 2014**

For Completion in the Student Service Centre (SSC)

Received in the SSC by *(name in capitals)*:			
Method of Submission *(Handed in to SSC; posted through internal/external mail)*:			
E-thesis Submitted ***(mandatory for final theses)***			
Signature:		Date:	

Please note this form should bound into the submitted thesis.

Updated February 2008, November 2008, February 2009, January 2011

TABLE OF CONTENTS

LIST OF TABLES

LIST OF FIGURES

LIST OF EQUATIONS

INTRODUCTION

The dictum '*Primum non nocere (*first, do no harm),' paraphrased from the Hippocratic Oath (Edelstein, 1943) has been an enduring and leading axiom for the institution of medicine and the delivery of healthcare services globally. However, medical harm is done every day. Not only does the medical literature bear testimony to this conundrum (Berwick and Leape, 1999; Jha *et al*., 2010; de Vries *et al*., 2008; Wilson *et al*., 2012) but public awareness of medical errors and unexpected adverse patient outcomes is mounting (Kohn *et al*., 1999).

Furthermore, management of healthcare costs and improving the quality of healthcare are ubiquitous challenges in healthcare organisations and systems today. A substantial percentage of public expenditure is rationed on maintaining healthcare systems. According to Cowan *et al*. (2004), $1.6 trillion was spent on healthcare in 2002 in the United States resulting in a 93% increase from the previous year. The Organisation for Economic Co-operation and Development (OECD), as a result of the analysis of thirty European countries, demonstrated that over the past ten years (1998-2008) the average *per capita* health spending had grown by 4.6% annually (OECD, 2012). European Union countries devoted, on average, 8.3% of their GDP to healthcare in 2008 increasing to 9.6% in 2010 (OECD, 2012). According to the United Arab Emirates (UAE) Ministry of Economy, the healthcare sector is expected to grow 16 percent annually with healthcare expenditure expected to rise from just $3.2 billion in 2005 to $11.9 billion in 2015. Costs associated with poor quality and medical errors are considerable. According to Kohn *et al*. (1999), the total national costs of preventable medical errors were estimated to be between $17 billion and $29 billion in the United States (US), annually. Using an actuarial approach the annual cost of measurable US medical errors, identified through medical claims data, was $17.1 billion in 2008 (Van Den Bos *et al*., 2011).

In response to concerns about quality, mounting costs and government regulated accountability standards, healthcare leaders at all levels are in search of effective methods for improving the quality of healthcare in organisations. Effective solutions, however, are proving to be a daunting challenge. Although several concepts, methodologies and tools have been postulated to advance quality and patient safety in healthcare (Baker and Norton, 2003; Berwick *et al*., 2006; Braithwaite *et al*., 2007; Kohn *et al*., 2000), there still exists a dearth of compelling evidence of their impact and effectiveness, none more so than the all-pervading strategy of accreditation (Shaw, 2003; Greenfield *et al*., 2007; Griffith *et al*., 2002; Whittaker *et al*., 2000; Øvretveit and Gustafson, 2003; Miller *et al*., 2005). Nonetheless, recent decades have seen an emerging trend that accreditation is a feasible measure to improve the quality of care and patient safety (Shaw, 2003; Greenfield *et al*., 2000).

Several of the established accreditation programmes provide development support to other countries, but Joint Commission International (JCI) was the first to offer external international accreditation. JCI is a not-for-profit affiliate that originated from the United States accreditation organisation Joint Commission. The extension of the Joint Commission model was initially visible during the 1990s in other English-speaking countries and Europe, Latin America (Arce, 1999), Africa (Whittaker *et al.*, 2000, Whittaker *et al*., 1998), and the Western Pacific (Ito *et al*., 1998). Globally, 'empirical evidence to sustain many claims about the benefits of accreditation is currently lacking' with no studies conducted regarding the value and impact of accreditation in the UAE healthcare sector (Braithwaite *et al*., 2006). Nevertheless, developing countries are frequently utilizing accreditation as a tool for government regulation to guarantee quality of care and improve patient safety. Many countries, including the UAE, are beginning to use accreditation as an extension of statutory licensing for institutions intended for control and public accountability. However, implementation of accreditation standards is demanding on individuals and organisations (James and Hunt, 1996). In addition, the empirical and theoretical literature on accreditation is sparse especially in the emerging economy of the Middle East.

The objective of this study is to determine whether hospital accreditation impacts on clinical quality and patient experience. The proposed research on the impact of accreditation is multi-method in nature and consists of three dimensions. The first dimension of the study is to explore the determinants of patient experience within the study hospital using a validated patient experience survey. The second dimension is a cross-sectional study of the impact of accreditation using patient experience scores of 27 accredited and non-accredited hospitals within the Abu Dhabi Emirate. The third dimension of the study is a time series analysis of the impact of accreditation over a four-year period (before and after accreditation) of a 150-bed hospital in Abu Dhabi (Al Noor Hospital). This research will be the ***first*** empirical investigation in the UAE context, designed to examine the impact of accreditation on hospital quality measures and patient experience. In summary, this thesis aims to make an important contribution to the under-investigated field of accreditation. Accordingly, this research has intellectual, empirical and policy applications for the future of hospital accreditation both in the UAE and internationally. The thesis offers insights and recommendations for improving the process of accreditation and the evaluation of patient experience.

1 CHAPTER ONE: The Literature Review and Literature Synthesis

1.1 The Literature Review

1.1.1 Introduction

The main purpose of this chapter is to review and critically appraise the existing literature on accreditation in healthcare in order to provide supporting information applicable to the research. To achieve this, an exhaustive updated search of numerous electronic bibliographic databases was performed, including Medline, from 1996 to December 2013; Cinhal, from 1982 to December 2013 and Embase, from 1980 to December 2013. Various keywords were utilised in mixed combinations, including ‘accreditation,’ ‘health service,’ ‘healthcare,’ ‘quality,’ ‘clinical measures,’ ‘quality indicators,’ ‘patient satisfaction,’ ‘patient experience’, and ‘impact.’ Using the snowballing technique, the references of all selected articles and pertinent review articles were examined to discover additional studies. All research that evaluated the impact of health service accreditation, irrespective of methodological design (including clinical trials, observational studies and qualitative studies) were included. No language restrictions were used. Research papers that were only published in ‘abstract’ format were excluded.

The results of the review will be included in this chapter as three focal segments. First, an introductory background on accreditation in healthcare will provide a general description of accreditation and its various components (e.g. its history, definition, scope and standards). The second part presents a critique of published literature in the field of healthcare accreditation, concentrating particularly on the impact of accreditation, as it is the subject of the current study. Finally, a review of accreditation and patient experience will be discussed in the third part of the chapter. The literature synthesis that follows the literature summary at the end of the chapter seeks to provide theoretical support for the study on the impact of accreditation in healthcare.

1.1.2 The History/ Evolution of Healthcare Accreditation

Hospital accreditation is not a novel notion. As far back as the 1860s, Florence Nightingale developed a system for collecting and evaluating hospital statistics, thereby underpinning healthcare quality assurance. Her results showed that mortality rates varied significantly from one hospital to another (Hanold *et al*., 2000).

Another pioneer in assessing healthcare quality was Dr. Ernest A. Codman, who released a study in 1914 that emphasised many of the same quality of care issues being examined today. These issues included: licensure and certification, accreditation, the necessity of considering the severity or stage of disease, the issue of comorbidity, the health and illness behaviour of the patient and economic barriers to receiving care (Graham, 1995). Codman, together with his colleague Franklin Martin, founded the American College of Surgeons (ACS) in 1913. In 1918, the ACS introduced the Hospital Standardisation Programme, which created the first hospital accreditation programme worldwide and used it as a formal means of assuring good hospital care. The result of the first survey revealed that many hospitals were not meeting the standards. However, by 1950, almost 95% of the hospitals qualified for approval (Robinson, 1995). Thereafter, and following the interest in the standard-based assessment of hospital performance, the ACS joined with other professional associations of doctors and hospitals as corporate members to form the Joint Commission on Accreditation of Hospitals in 1952.

During 1986 in the United States, the Joint Commission on Accreditation of Hospitals (JCAH) changed its name to the Joint Commission on Accreditation of Healthcare Organisations (JCAHO). The Joint Commission has concentrated its activities on hospitals where most people receive their care (Bohigas *et al*., 1996). The purpose of JCAHO was to encourage voluntary attainment of uniform standards of institutional care for all healthcare areas (e.g. pharmacy, nursing, physical plant). The emphasis was on process and structural standards and it was assumed that good care and favourable outcomes would follow (JCAHO, 1998).

In the 1960s and 1970s, the American public developed greater expectations about healthcare. The period was marked by concern for consumer protection, human rights and the concept of healthcare as a right. It was this mind-set that led to the passage of

Medicare and Medicaid legislation in the 1960s. The US Government became a major healthcare system payer and began examining means of assessing healthcare delivery, including JCAHO oversight. As a result of the increased attention on JCAHO, hospital participation in this survey process increased significantly during this period. By 1972, over fifty percent of the hospitals in the U.S. were participating in the JCAHO survey process (JCAHO, 1998).

JCAHO accreditation is now regarded as the gold standard in institutional healthcare quality (Robinson, 1995). The Joint Commission's model, JCAHO, spread first to other English-speaking countries, that is Anglophone countries such as Canada (in 1958) and Australia (1974), and then into Europe (Shaw and Brooks, 1991; Giraud, 2001), Latin America (Arce, 1999), Africa (Whittaker *et al*., 1998) and South East Asia (Ito *et al*., 1998; Huang *et al*., 2000) during the 1990s. In addition to voluntary programmes, mandatory programmes have also recently been adopted in France, Italy and Scotland. At least 28 countries now have an operational accreditation programmes (WHO, 2003).

1.1.3 Defining Accreditation

A diverse range of definitions exists to describe the accreditation approach (Hurst, 1997). In relation to this, Bruchacova (2001) notes that *'There is a considerable difference in the perception of the role of accreditation. The interpretations vary from a badge of achievement to a management tool to create change'* (p.155).

'The accreditation process, which comprises a self-assessment, a field visit and a report looks at the entire organisation and thus serves to arrive at a global appreciation of the hospital' (Pomey *et al*., 2004 p.113).

James and Hunt (1996) and Pomey *et al*. (2004) underscored the organisation-wide nature of accreditation in their definitions:

'[Accreditation is] an organisation-wide quality assessment tool and examines the function of the hospital as a whole rather than either an activity or outcomes of specific departments, clinical specialities or procedures, it is a framework of organisational standards which are concerned with the systems and process for the delivery of healthcare' (James and Hunt 1996 p.49).

and:

The World Health Organisation (2003) also explicates the role of multi-disciplinary teams in their definition of healthcare accreditation:

'The term 'accreditation' (applied to organisations rather than specialty clinical training) reflects the origins of systematic assessment of hospitals against specific standards…accreditation is usually performed by a multidisciplinary team of health professionals and is assessed against published standards for the environment in which clinical care is delivered' (World Health Organisation, 2003 p.58-59).

Scrivens (1995a) presents an inclusive definition of healthcare accreditation in which the implementation of accreditation may be viewed within the framework of planned organisational change (organisational development). As per Scrivens (1995a), accreditation is *'… a process used for the assessment of the quality of organisational activity. It is based on a system of external peer review using standards…an assessment of compliance with standards is conducted by health service personnel, on behalf of an independent body. The outcome of the process is a grading or score awarded to a health service organisation which denotes the level of compliance with the standards…Accreditation systems encompass not only processes of monitoring. They are also vehicles for education and organisational development'* (Scrivens, 1995a p.1).

Additionally, accreditation is dissimilar to those organisation-wide quality approaches, which have been developed internally by the organisation itself to be organisation and context specific. Accreditation represents what might be termed as an 'off-the-shelf' approach to managing quality in healthcare (Taylor, 1995). Essentially, it represents an external approach, which Shaw (2000) defines as *'…a regional or (potentially) national process voluntarily entered by service provider organisations for the improvement of organisation and delivery of health services assessed against explicit, published standards by peer group teams moderated by a non-partisan authority involving (but impartial to) users, providers, purchasers and government'* (p.169). Moreover, the concentration of the accreditation process is on the unique and detailed aspects of healthcare services (Klazinga 2000; Heaton 2000). In general, accreditation may be defined as an external evaluation process or system, which assesses the performance of healthcare organisations by evaluating their compliance with pre-established standards aiming at continuous quality improvement rather than simply maintaining minimal standards (Shaw, 2004; Pomey *et al*., 2005; Braithwaite *et al*., 2010).

In summation of the literature (WHO, 2003; Shaw, 2004c; Shaw, 2004b; Scrivens and Lodge, 1997; Heaton, 2000; Donahue and Vanostenberg, 2000), accreditation is identified as having the following characteristics:

- A public recognition of the achievement of accreditation demonstrated through an independent external peer assessment of that organisation's level of compliance in relation to the standards;
- The most renowned and enduring process for the external evaluation of healthcare services for patient safety and healthcare quality using the skills of an external, multidisciplinary and trained team of assessors;
- Development of Accreditation standards and processes by healthcare professionals for healthcare institutions;
- Is typically voluntary (with the exception of national accreditation programmes that are mandatory, e.g. in France) and available to public and private sectors.
- Traverses a wide range of healthcare environments from local primary healthcare through to tertiary-level providers and healthcare systems, and may have specialised healthcare services (like mental health) as a particular focus.
- Essential to accreditation are two important characteristics: the perception of external review and the implementation of previously determined standards (Scrivens, 1995a).

Further elaboration of accreditation reveals the following (Jovanovic, 2005): achieving accreditation standards means ensuring a safe environment, preventing or reducing risk to patients and staff, and helping healthcare providers to identify their own organisations' strengths and weaknesses. In a rapidly and daily changing healthcare industry, accreditation standards can be a reliable platform that helps healthcare providers to sustain their system and address quality and safety of healthcare services. Considering healthcare's high level of information asymmetry, accreditation can make markets more efficient by allowing payers to better assess what they are paying for.

Most healthcare accreditation programmes consists of episodic or cyclical assessments of organisational and clinical performance against pre-established, evidence-based standards. This is usually done through self-assessments, peer surveyor on-site visits, interviews by the surveyors, and the careful examination of administrative and clinical data and documentation. This process culminates in an accreditation report and declaration about the organisation’ accreditation status (Nicklin, 2013). The hospital then receives a certificate of accreditation, which is valid for a specific period of time (from one to three years).

Accreditation is generally viewed as a formal process of assessment (Rooney and vanOstenberg, 1999), usually by manifold methods including: observation (of the facility and direct patient care), interviews (of patients and staff), documentation audit (medical and administrative documents), evaluation of equipment and review of key clinical and organisational data. These comprehensive assessments are performed at both an organisational (e.g., hospital) and service (e.g., ward, out- patient clinic or diagnostic laboratory) levels. The intention is to certify that organisations and their constituent services meet current designated standards. ‘Accredited organisations and services receive public recognition of their status. In most accreditation models, organisations can be accredited, or be granted time to improve following remedial recommendations, or if performance falls below stipulated standards, they can lose their accreditation status. Accreditation processes are designed therefore, to ensure both compliance and improvement by stimulating positive and longitudinal change in organisational and clinical practices. Through these ends, the goal is for accreditation to contribute to the production of high quality and safe care for the benefits of consumers’ (Braithwaite *et al*., 2010).

1.1.4 Accreditation Internationally

Accreditation is an internationally recognised evaluation process used in many countries to assess the quality of health services provided. It is a means of publicly recognizing that a healthcare organisation has met national standards of quality (Pomey *et al*., 2005). Accreditation is a growing, worldwide phenomenon (Braithwaite *et al*., 2006). The accreditation process is an integral part of healthcare systems in over 70 countries (Greenfield and Braithwaite, 2009) and the International Society for Quality in Healthcare (ISQua) is the largest associated international body. In some regions, the accreditation of healthcare organisations remains voluntary, while in others it has become government-mandated (Pomey, 2010). Its rapid growth over the last 40 years is partially attributable to media reporting of serious inadequacies in the quality and safety of healthcare services and an escalating focus on patient safety (Nicklin, 2013). According to the WHO (2003), at least 28 countries have an operational accreditation programme. International healthcare accreditation agencies that are widely renowned include the Australian Council for Healthcare Standards International (ACHSI), Quality Healthcare Advice (QHA) Trent, Accreditation Canada and Joint Commission International.

1.1.5 Joint Commission International (JCI) Accreditation

JCI is a not-for-profit affiliate formed by JCAHO to provide leadership in healthcare accreditation and quality improvement for organisations outside the United States. JCI accreditation began at the end of 1998 and the first hospital to be accredited outside the USA was the Israelita Albert Einstein in Brazil, while the American Hospital in Dubai was the first in the Middle East in 2000. A total of 404 hospitals are accredited outside the USA at the end of 2010 in 48 countries around the world. There was a growth from 10 JCI surveys conducted in 2004 to 177 surveys conducted in 2010 (Jacobson A., 2011). JCI standards are the basis for accreditation and certification of individual healthcare facilities and programmes around the world. In addition, JCI standards have been used to develop and to establish accreditation programmes in many countries and have been used by public agencies, health ministries, and others seeking to evaluate and to improve the safety and quality of patient care. (Joint Commission International, 2011, pg. v). A hospital seeking to obtain JCI accreditation is visited every three years by a survey team that observes hospital operations, conducts interviews, and reviews medical documentation for compliance with a set of standards (Chen *et al.*, 2003). A team of trained surveyors that include experienced healthcare professionals conducts the surveys on-site. These members can include physicians, nurses and hospital administration executives. The number of team members is based upon the size and complexity of the organisation. The goal of the survey is to evaluate care, organisational processes and to provide education and consultation to the organisation with the objective of promoting continual improvement for the organisation under survey.

1.1.5.1 JCI Standards

The JCI standards were developed with the help of an international task force and were designed to accommodate the legal, religious and cultural factors within a country. The standards focus upon adaptability to local needs, the quality of patient care and safety. The standards are cross-referenced to International Organisation for Standardisation (ISO) and European Foundation for Quality Management (JCI, 2003).

The JCI (2011) organises its standards into ‘functional chapters’ around those functions found to be common to all healthcare organisations. In addition, the JCI has requirements related to promoting safe practices which it calls international patient safety goals and whose purpose is to promote specific improvements in patient safety. These goals highlight problematic areas in healthcare organisations and describe solutions based on expert consensus. The goals cover the following areas:

• Goal one: identifying patients correctly.
• Goal two: improving effective communication.
• Goal three: improving the safety of high-alert medications.
• Goal four: ensuring correct-site, correct-procedure and correct-patient surgery.
• Goal five: reducing the risk of healthcare-associated infections.
• Goal six: reducing the risk of patient harm resulting from falls.

A summary of each chapter of the standards is given in Table 1.1 below. The standards are classified as patient-centered and organisation-centered (Joint Commission International, 2011).

Table 1.1 Summary of JCI chapter standards- fourth edition (2011)

Classification	Standard	Description
Patient centered standards	**Access to care and continuity of care**	Considers that care provided is an integrated system of services, healthcare professionals and levels of care, which make up a continuum of care. The goal is to correctly match the patient's healthcare needs with the services available in the organisation, then plan for discharge and follow-up.
	Patient and family rights	Healthcare organisations work to establish trust and open communication with patients and to understand and protect each patient's cultural, psychosocial and spiritual values. Patient care outcomes are improved when patients and their families or those who make decisions on their behalf are involved in care decisions and processes in a way that matches cultural expectations.
	Assessment of patients	An effective patient assessment process results in decisions about the patient's emergency or immediate treatment needs and continuing treatment needs, even when the patient's condition changes.
	Care of patients	Providing the most appropriate care in a setting that supports and responds to each patient's unique needs requires a high level of planning and coordination.
	Anaesthesia and	The use of anaesthesia, sedation and surgical interventions require

	surgical care	comprehensive assessment, integrated care planning, continued patient monitoring and criteria-determined transfer for continuing care, rehabilitation and eventual transfer and discharge.
	Medication management and use	Medication management is a multidisciplinary, coordinated effort by the staff of a healthcare organisation, for effective process design, implementation and improvement to the selection, procuring, storing, ordering, prescribing, preparing, dispensing, administering, documenting and monitoring of medication therapies.
	Patient and family education	Patient and family education helps patients better participate in their care and make informed care decisions. Learning is most effective when it suits an individual's learning preferences, religious and cultural values, and reading and language skills, and when it occurs at appropriate points in the care process.
Organisation centered standards	**Quality improvement and patient safety**	Quality improvement and patient safety programmes are leadership driven; seek to change the culture of an organisation; proactively identify and reduce risk and variation; use data to focus on priority issues; and seek to demonstrate sustainable improvements.
	Prevention and control of infection	The goal of an organisation's infection surveillance, prevention and control programme is to identify and reduce the risks of acquiring and transmitting infections among patients, staff, doctors, contract workers, volunteers, students and visitors.
	Governance, leadership and direction	Providing excellent patient care requires effective leadership, which comes from many sources in a healthcare organisation, including governing leaders, clinical and managerial leaders, and others who hold positions of leadership, responsibility and trust.
	Facility management and safety	Healthcare organisations work to provide safe, functional and supportive facilities for patients, families, staff and visitors. The physical facilities, medical and other equipment and people must be effectively managed. In particular, management must strive to reduce and control hazards and risks, prevent accidents and injuries and maintain safe conditions.
	Staff qualifications and education	The organisation's clinical and administrative leaders must work together to identify the number and types of staff needed based on the recommendations from department and service directors
	Management of communication and information	To provide, coordinate and integrate services, healthcare organisations rely on information about the science of care, individual patients, care provided, results of care and their own performance. Information is a resource that must be managed effectively by the organisation's leaders

1.1.6 Accreditation in the United Arab Emirates

Accreditation practice in Abu Dhabi is still in the process of development. It was in May, 2006 that the first hospital in the Emirate was accredited by Joint Commission International (Joint Commission International website). In 2009 the UAE Ministry of Health announced that hospitals in the UAE must implement systems and practices that meet international standards by the year 2014. This accreditation rule will apply to both the private and government sectors; although, at the time of writing accreditation is voluntary in the UAE.

The UAE health ministry is required to convince local customers that hospitals offer a good standard of care at a reasonable price, and stop large numbers of patients going overseas for medical treatment. The UAE also wishes to compete for a share of the growing 'medical tourism' sector. The Health Authorities wish to win business from other Gulf States, but in order to do that, they have to build public confidence in local hospitals. Dr. Hanif Hassan Ali, Minister of Health issued a press statement in April 2011 that 'The Ministry's concern in achieving international accreditation for all its health facilities is one of the ministry's new strategies following the instructions of His Highness Shaikh Khalifa bin Zayed Al Nahyan, UAE President, and His Highness Shaikh Mohammed bin Rashid Al Maktoum, Vice- President and Prime Minister of UAE and Ruler of Dubai to raise the health services for nationals and residents in all fields'. The Ministry has signed a contract with Joint Commission International to accredit hospitals in the region (M.O.H., 2011). There are several accreditation bodies internationally, but Joint Commission International Accreditation is the main accrediting body for healthcare organisations in the Abu Dhabi Emirate. No national accrediting body exists at the time of writing.

1.1.7 The Impact of Accreditation

1.1.7.1 Methodological approaches

As a result of the literature search, twenty-five studies on the impact of accreditation were identified that met the criteria for inclusion. The impact of accreditation programmes has been researched with a variety of focuses, methodologies and degrees. Six categories of accreditation research that were relevant to the thesis were identified, namely: professions' attitudes to accreditation, change promotion, organisational impact, cost, quality improvement and performance measurement and patient satisfaction.

Previous reports also employed different research designs with varying strengths and limitations. Among these studies, only two were randomised control trials on accreditation of hospitals in South Africa (Salmon *et al*., 2003) and Denmark (Juul *et al*., 2005). Salmon *et al*.'s (2003) study revealed only marginal or no differences between groups over time with the exception of nurses' perception of clinical quality.

Two research papers had pre-test and post-test data but did not have a comparison group (Pomey *et al*., 2004; Al Awa *et al*., 2011), while 12 other articles (Beaulieu and Epstein, 2002; Chen *et al*., 2003; Duckett, 1983; Vestraete *et al*., 1998; Al Tehewy *et al*., 2009; Barker *et al*., 2002; Paccioni *et al*., 2008; Chandra *et al*., 2009; Sack *et al*., 2010; Sack *et al*., 2011; Selimoto *et al*., 2008; Demestriades *et al*., 2005) had group comparisons but did not have pre- and post-test data.

The above research showed mixed results. Some investigations found that accreditation appeared to have a positive impact, while others found inconsistent or no impact of accreditation on quality. Two retrospective inquiries regarding employee perception of the impact of accreditation (El-Jardali *et al*., 2008; Pomey *et al*., 2004) revealed positive associations between accreditation and some quality indicators. Seven investigations (Demestriades *et al*., 2005; Beaulieu and Epstein, 2002; Miller *et al*., 2005; Moffett and Bohara, 2005; Pasquale *et al*., 2001; Heuer, 2004; Thornlow and Merwin, 2009) compared accreditation scores or levels of accreditation to outcomes and found that accreditation was not always associated with better outcomes.

Overall, the literature reveals only moderate evidence in support of accreditation. The results could be summarised in terms of the impact of accreditation on structural, process, and outcome indicators of quality. The majority of the articles published examined the impact of accreditation on process indicators of quality, including monitoring procedures, course and content of services. Although several found that accreditation had a positive impact on processes (El-Jardali et al., 2008; Pomey et al., 2004), the results were not always consistent. Nineteen of the twenty-four papers examined outcomes, including programme outcomes, client outcomes, and client satisfaction. They found a mix of positive, negative, and neutral effects of accreditation.

Further analysis of the literature shows that different approaches have been adopted by researchers to examine the performance of accreditation programmes in healthcare. Some studies have investigated possible outcomes and impact of these programmes on accredited organisations (Pomey *et al*., 2004; Heuer, 2004). A wide range of outcomes have been associated with accreditation in this approach, such as providers' or patients' satisfaction, change and overall improvement in quality. Other investigations have tried to analyse accreditation performance by looking into their structure and process (i.e. the main components) such as survey or standards (Greenfield *et al*., 2008; Greenfield *et al*., 2009). Scrivens (1996) argues that each of the individual components of accreditation can be scrutinised to see whether they have any effect upon the processes of delivery and outcomes of healthcare.

These approaches are claimed to make use of two general measures, i.e. 'objective indicators' and 'people's experiences/perceptions' (Scrivens, 1997a, p.6). The former, which is an outcome-based analysis, requires that tangible measures of success (in the form of performance indicators) be developed or extracted from evaluated organisations. The relationship between accreditation and the indicators is subjected to statistical analysis. In other words, any change, improvement and/or increase in particular qualitative or quantitative indicators of accredited healthcare organisations are investigated. The positive results are then attributed to the effectiveness of accreditation and seen as a confirmatory sign of its impact on the organisations. According to the 'people's experience or perception' methodology, the perceptions of different groups such as providers (e.g. nurses, managers) surveyors and patients are elicited regarding the accreditation's overall performance or components (Scrivens, 1997a, p.6). This mode of evaluation allows individuals to suggest their own interpretation of improvements in the quality of service. This methodology has been used by both approaches to performance analysis of accreditation.

The perception approach has been criticised for being superficial and judgemental (Scrivens, 1997a), whilst criticisms of objective indicators focus upon difficulties of measuring outcomes in healthcare. Eddy (1998) points out that measuring outcomes in healthcare is a complicated process because healthcare outcomes are highly probabilistic. Positive healthcare outcomes may not always occur when an intervention, such as accreditation, is effective. As such, conclusions about the results of any intervention (in the form of measurement or improvement) might require a large number of observations and statistical analyses. Another issue concerns the long delays in achieving healthcare outcomes.

Control over the outcomes is another challenge indicating that the outcomes in healthcare may be determined by other factors beyond the control of a given evaluation programme (Eddy, 1998; Kessner and Kalk, 1973). Therefore, impact on healthcare outcomes may not be related merely to the actions of an accreditation. Another difficulty of using objective indicators, as de Walcque *et al*. (2008) put it, is that standards of accreditation are mostly concerned with structure and process-related performance indicators rather than outcome indicators. Moreover, they argue that stakeholders seldom concur on the intended outcomes (de Walcque *et al*., 2008). The time series analysis in this study utilises organisation-wide indicators, observed month by month over a 4-year period, in an unchanged hospital setting. The hospital environment remained constant in terms of organisational changes over the investigation period (2009-2012). The hospital did not undergo any changes in the organisational or leadership structure and no changes in the services provided or staffing ratios were observed. Most importantly, the quality leadership during this period remained the same thus ensuring that the data collection of the quality measures maintained the status quo. This study will bridge the research gap in terms of accreditation's impact over controlled quality outcomes.

In view of these problems, researchers are inclined to utilise perceptions and experiences of different groups in analysing the performance of accreditation. Some researchers have tried to overcome these difficulties by using intermediate (outputs) or proxy measures reflecting long-lasting healthcare outcomes such as enhanced compliance of healthcare organisations with external quality measures or patient satisfaction along with or after evaluation by these programmes (Salmon *et al*., 2003). The ideal and comprehensive evaluation might result from using a combination of these two methodologies. This study has thus responded to this recommendation by using multiple methodologies (i.e. time series analysis, case study and triangulation with a cross-sectional study). The following section reviews existing literature in the light of the aforementioned approaches (outcome and process-based) to the performance analysis of accreditation, drawing from Braithwaite *et al*. (2006) and Greenfield and Braithwaite (2009).

1.1.7.2 Literature findings

There are contradictory views and inconsistent findings regarding the impact of accreditation on patient outcomes. An investigation conducted by Sack *et al*. (2010), demonstrated that, in the field of cardiology, successful accreditation was not linked with better quality of care as perceived by the patient and reflected by the recommendation rate for a given institution. However, some researchers indicate that accreditation improves their operations and performance in terms of effectiveness and efficiency (Helbig *et al*., 2006). Other investigations of performance measures (such as patient safety indicators or survival rates for special diseases) and accreditation did not find any or no clear relationships between them (Chen *et al*., 2003; Miller *et al*., 2005). A North American study investigating the relationship between Joint Commission on Accreditation of Healthcare Organisation's accreditation scores and the Agency for Healthcare Research and Quality's Inpatient Quality Indicators and Patient Safety Indicators found no signification association between the two variables (Miller *et al*., 2005).

Existing research lacks rigorous in-depth analysis of the accreditation process and the relationship between accreditation and performance, outcomes, quality improvement, and patient safety (Braithwaite *et al*., 2006; Greenfield *et al*., 2007; Greenfield and Braithwaite, 2008). Ovretveit and Gustafson (2002) revealed that the literature research contained relatively little evidence regarding the overall effectiveness of quality interventions and quality standards in healthcare. This highlights the need for more in-depth research in this area; consequently this thesis proposes to determine whether there is a causal relationship between accreditation and quality measures by using a time series analysis before and after accreditation in a controlled environment.

Although, there is a corpus of anecdotal evidence and numerous testimonials of performance improvement from healthcare organisations, 'empirical evidence to sustain many claims about the benefits of accreditation is currently lacking' (Braithwaite *et al*., 2006; Greenfield and Braithwaite, 2009). A multi-method, systematic review of 66 academic articles and organisational reports relating to accreditation and research revealed that consistent findings were recorded in the categories of change promotion and professional development. Inconsistent findings were identified in five categories: the professions' attitudes to accreditation; organisational impact; financial impact; quality measures; and programme assessment. There were insufficient papers written on the categories of: consumer views or patient satisfaction; public disclosure; and surveyor issues. Thus, no conclusions could be drawn in these areas (Greenfield and Braithwaite, 2008). Studies testing for the association between accreditation and patient satisfaction are limited and inconclusive (Dean Beaulieu and Epstein, 2002; Greco *et al*., 2001; Heuer, 2004; O'Connor *et al*., 2007).

Cost containment continues to be a concern, and therefore, hospitals need to evaluate the costs and benefits of accreditation. The process of accreditation requires resources and time (Øvretveit, 2005). Until empirical, evidence-based research on accreditation is forthcoming, questions regarding the value and impact of accreditation will continue to be raised.

Existing literature abounds with various research papers showing either confirmatory (Devers *et al*., 2004; Rooney and vanOstenberg, 2004; El-Jardali *et al*., 2008; Sekimoto *et al*., 2008) or neutral (Miller *et al*., 2005; Salmon *et al*., 2003; Snyder and Anderson, 2005; DeBritz and Pollak, 2006) evidence regarding the effects of accreditation on healthcare organisations, with no consistent results being found. Sunol *et al*. (2009, p. 27) have located the prior literature on the impact and performance of accreditation in two distinct areas:

I. The impact of accreditation on the quality and safety of healthcare delivery. This could include organisational and managerial changes due to accreditation, professional involvement and satisfaction with the accreditation and changes in organisational culture.

II. The efficiency of accreditation tools and systems (structure and process) for providing feedback with reliable information both to the accreditation organisations and to all key stakeholders.

1.1.7.3 Professions' attitudes to accreditation

A recent study concluded that effective implementation of accreditation requires health professionals to embrace accreditation as a legitimate quality and safety tool (Hinchcliff *et al.*, 2013). Several scholars have researched healthcare providers' attitudes towards accreditation (Baker, Morrone and Gable 2004; Casamassion and Wilson 1999; Gough and Reynolds 2000; Macfarlane, Tavabie and Descombre 2003; Reznich and Mavis 2000; Scanlon and Hendrix 1998; El-Jardali, *et al*., 2008; Al Awa. *et al*., 2011). These present contrasting views of professional attitudes, which both support and criticise accreditation programmes. In many studies, healthcare professionals supported or were in agreement about their respective accreditation standards (Baker *et al.*, 2004; Casamassion and Wilson, 1999; Gough and Reynolds, 2000; Macfarlane *et al*., 2003; Reznich and Mavis, 2000; Scanlon and Hendrix, 1998). However, all reports, with one exception (Gough and Reynolds, 2000) which recorded improvement due to accreditation, did not attempt to examine the impact of the programmes.

Verstraete *et al.* (1998) examined the relationship between accreditation and healthcare professionals in three medical laboratories in Belgium and Netherlands. A non-validated multiple choice questionnaire was administered to a small sample of staff. Staff at two laboratories did not think accreditation improved the quality of results. Despite the challenges of accreditation (higher workload and more paperwork), a majority of technologists preferred to work in an accredited laboratory. However, these results may not be extrapolated to other countries and situations. The population sampled was not consistent, as the periods of the survey and accreditation differed within the sample.

Al Awa. *et al*. (2011) conducted a cross-sectional electronic survey of 820 registered nurses in a Saudi Arabian 878-bed teaching hospital. Nurses perceived better quality improvement and patient safety following accreditation. The findings are only applicable to nurses in a teaching hospital. Another Middle Eastern cross-sectional survey evaluating nurses' perception of the impact of accreditation was conducted in Lebanon (El-Jardali *et al*., 2008). Some 1048 registered nurses from 59 hospitals were sampled. They perceived an improvement in quality during and after the accreditation process. Even with the large sample size, the results were based only on nurses' perceptions and no quantitative data analysis was conducted. The study cannot be generalised to hospitals that undergo accreditation for the first time as only hospitals that underwent two accreditation surveys were included. Additionally, neither surveys conducted pre-accreditation and post-accreditation comparisons nor included the use of validated survey tools.

Further investigations have documented healthcare professionals' critiques of accreditation. These research reports imply that health professionals have concerns regarding accreditation programmes, including: accreditation being both time consuming and challenging (Verstraete *et al.,* 1998; Stoelwinder, 2004;) while the benefits for patient care are perceived to be minimal (Fairbrother and Gleeson, 2000; Stoelwinder, 2004); accreditation costs, whether direct or indirect, are thought to be excessive (Fairbrother and Gleeson, 2000); there is a perception that surveyors are inconsistent (Grenade and Boldy, 2002); and there are problems with accreditation standards (Pongpirul *et al*., 2006). An Indian research report examined stakeholder opinions about the proposed introduction of an accreditation programme. The study found that stakeholders both supported and expressed concerns about the proposed programme (Nandraj *et al.,* 2001). There have been investigations into the reasons why healthcare professionals working in rural areas have failed to participate in an accreditation programme (Brasure *et al*., 2000; Casey and Klingner, 2000). Cost was identified as the major impediment (Brasure *et al*., 2000) as were the challenges faced in data collection and complying with the accreditation standards (Casey and Kingner, 2000).

1.1.7.4 Quality Improvement and Performance Measurement

A continual improvement philosophy is embedded in the healthcare accreditation process. Firstly, accreditation standards promote the achievement of particular criteria by organisations. Secondly, accrediting bodies review their standards periodically so that they are up-to-date, evidence-based and encourage best practice. The combination of these fundamentals drives continuous quality improvement endeavours. The goal is to contribute to the provision of high-quality and safe healthcare services and to improve patients' health outcomes (Braithwaite, 2010).

Quality improvement as an 'outcome' is defined as any positive change in quality measures(such as clinical or process indicators) as a result of accreditation; for example, low incidence of infection, improved continuity of care, and accuracy of diagnosis (de Walcque *et al*., 2008). Greenfield and Braithwaite (2007) have described the relationship between quality measures (i.e. outcomes) and accreditation as complex with no apparent direct clear-cut relationship between them. Griffith *et al*. (2002) have reported a potential disconnect between JCAHO accreditation and outcomes. Grasso *et al*. (2005) expressed similar ideas in connection with accreditation and the rate of medication errors. Beaulieu and Epstein (2002) have noted, in their cross-sectional study that, while health plan data were positively associated with increased enrolment in the accreditation programme and higher accreditation scores, it does not ensure high-quality care or a minimal level of performance. Miller *et al*. (2005) have arrived at rather similar results in their research investigating the relationship between performance measurement and accreditation. They demonstrated that, despite scoring highly on JCAHO measures, no significant relationship between JCAHO categorical accreditation decisions and quality and safety indicators in the accredited hospitals was identified. Accordingly, they identified a need to continuously re-evaluate all measurement tools to ensure that they are providing the public with reliable, consistent information about healthcare quality and safety. A recent investigation (Ammar *et al*., 2013) used case-mix index to indicate that the current link between accreditation and reimbursement rate was not appropriate in Lebanon, and leads to unfairness and inefficiency in the system. They proposed changing the current reimbursement system to include case mix and outcome indicators in addition to accreditation. However, this investigation did not examine non-accredited hospitals, but, rather, hospitals with varying levels of accreditation, making it difficult to gauge the link between accreditation and quality.

In a South African randomised controlled trial, 20 randomly selected public hospitals, stratified by size, were selected. Ten hospitals were randomised to the accreditation programme in 1998; the other ten served as controls. Survey data from the Council for Health Services Accreditation of Southern Africa (COHSASA) programme were used. In addition, data on eight indicators of hospital quality of care were collected. With the exception of nurse perceptions of clinical quality, there was little or no effect of accreditation on seven other indicators of quality. These included patient satisfaction (n=1923) which did not improve in accredited hospitals compared to non-accredited hospitals (Salmon *et al*., 2003). While this research is noteworthy as it was one of only two randomised controlled trials on the impact of accreditation, it is not without weaknesses. The patient satisfaction survey used was not assessed for validity and reliability and data were collected at only two points in time. In addition, quality indicator collection occurred, on average, ten months after the baseline survey in the intervention hospitals. It is possible that these hospitals had made considerable progress that was not captured because the first round was too late to be a true baseline. Furthermore, only nine months on average elapsed between the two data collection periods. Given what is known about organisational change, this time interval may have been too short to capture any eventual outcomes of the accreditation programme.

In a large analysis of the Zambia Hospital Accreditation Programme (n=79 hospitals), accreditation was associated with significant improvement in compliance with standards in the overall scores, and in 7 out of 13 important functional areas (Bukonda *et al*., 2003). However, this evaluation did not include a comparison group and impact was assessed only in terms of compliance scores rather than quality measures. Again, data were collected at only two points in time. Our current study will overcome this limitation by studying the impact of accreditation using a monthly time series of observations of multiple quality measures.

In a longitudinal examination of 23 hospitals in Australia, hospitals were monitored over two years for their response to accreditation requirements and the general changes in accreditation in the hospital's environment. There was an improvement in the structure of medical staff organisation, nursing organisation, physical facilities and safety (Duckett, 1983). However, no statistical tests were conducted in this study and no quality measures were used. In another cross-sectional examination conducted in Copenhagen on 51 units (38 surgical and 13 anesthetic), significantly more accredited units had guidelines in place compared to non-accredited units. The improvement on the Systematic Development Scale was significantly higher in accredited than in non-accredited units (Juul, 2005).

In a cross-sectional analysis of the National Committee on Quality Assurance (NCQA) and Health Plan Employer Data and Information Set (HEDIS) databases, accredited plans had higher HEDIS scores, but there was no statistically significant difference between accredited and non-accredited plans on patient-reported measures of quality and satisfaction (Beaulieu and Epstein, 2002). However, the study was limited due to the use of patient reported secondary data. In an analysis of data from 742 hospitals using 7 performance measures against JCAHO accreditation scores, there was no correlation between Joint Commission measures with outcome measures (Griffith *et al*., 2002). In another large cross-sectional analysis of JCAHO accreditation scores and the Agency for Healthcare Research (AHRQ), Inpatient Quality Indicators (IQI) and Patient Safety Indicators (PSI) (n=2116 institutions), lower performance on the PSI factor was associated with lower performance on JCAHO scores ($P \leq 0.02$) (Miller *et al*., 2005.)

However, the above research papers were limited due to their use of secondary data which may not be closely related to the standards of accreditation. In addition, there was no control group or pre-post test data.

Salmon *et al*. (2003), similar to Snyder and Anderson (2005), stated that accreditation had little or no effect on clinical indicator performance, in spite of improved compliance of accredited organisations with the standards instigated after accreditation. They have called for additional work to determine whether improvements in the accreditation structure and process standards result in improved outcomes. A weak relationship between accreditation and quality measures was also identified by Hadley and McGurrin (1988), even though the accredited or certified hospitals were more likely to have higher values on specific indicators than hospitals without accreditation.

In a cross-sectional examination using data from Centers for Medicare and Medicaid Services (CMS) in US (n=134, 579 patients from 4221 hospitals), patients treated at accredited hospitals were more likely to receive higher quality of care for the management of acute myocardial infarction (AMI) than those treated at non-accredited hospitals. In this examination, the mortality rate was lower post AMI in accredited hospitals than in non-accredited hospitals (Chen *et al*., 2003). This study however, is not generalisable to other settings as it focuses only on the management of AMIs.

An American prospective cohort investigation of medication errors, using a stratified random sample of 36 institutions (comprising of JCAHO accredited hospitals, non-accredited hospitals and skilled nursing facilities), found no significant difference between error rates across the three settings (Barker *et al*., 2002). The investigation had sampling limitations as five of the non-accredited hospitals achieved accreditation status during the study period (7 months). Moreover, data collection was by observation and, thus, the results may have been influenced by the Hawthorne effect.

Sekimoto *et al.* (2008) conducted a cross-sectional survey in Japanese teaching hospitals over two consecutive years (n= 638 hospitals), studying the impact of hospital accreditation on infection control programmes. The overall infection control performance score was significantly associated with accreditation status. Nonetheless, the survey sample was limited to patients from teaching hospitals that had relatively abundant human and financial resources. Thus, the results may not be generalisable to non-teaching hospitals, which are often smaller and have inadequate resources. Second, the responses may not represent the actual conditions of infection control performance because the questionnaire was based on self-assessment.

Using secondary data, a cross-sectional analysis was conducted in the United States to evaluate the association between the Society of Chest Pain Centers (SCPC) accreditation and adherence to evidence-based guidelines for the management of AMI (n= 33,238 patients treated at 344 hospitals). Patients treated at accredited centres (n=3059) were significantly more likely to receive aspirin and B-blockers within 24 hours than patients at non-accredited centres (n=30,179). However, the sample consisted of 21 accredited and 323 non-accredited centres and it is unclear how comparable these institutions were (Chandra *et al*., 2009). In addition, causal inferences cannot be drawn as it is not known whether the results are due to accreditation or the implementation of clinical guidelines.

Thornlow and Merwin (2009) conducted a cross-sectional examination of a stratified sample of 115 US general medical surgical community hospitals in 20 states. Administrative data from 1,430,981 patient records were used to examine the relationship between patient safety related accreditation standards and patient outcomes. Results showed that accreditation standards, reflecting certain patient safety practices, were related to some outcomes (infection rates, decubitus ulcers) but not to others (post-operative respiratory failure and failure to rescue). Whilst the study used a large sample, the use of administrative data introduced potential bias in detecting some patient safety events, which are better identified through in-depth clinical reviews. In addition, variations in performance observed between large and small hospitals could not be explained. The results were limited as only four measures were selected for analysis.

A research initiative, known as Quest for Quality and Improved Performance (QQIP), with a focus on the quality of healthcare in the UK and USA, demonstrated mixed results regarding the effects of accreditation programme (Sutherland and Leatherman, 2006). The authors conclude that, despite the evidence of an association between quality of care and accreditation status, there was no evidence of causality between them. The association could, therefore, be a result of the high-performing organisations choosing to participate in accreditation, rather than accreditation processes leading to better performance or higher-quality healthcare. Moreover, the following findings have been achieved by this initiative in relation to accreditation (de Walcque *et al*., 2008; Sutherland and Leatherman, 2006; Mays, 2004):

- No correlation between JCAHO scores and other, evidence-based measures of healthcare quality and safety
- No significant difference in the medical error rates between accredited and non-accredited hospitals
- No correlation between patient satisfaction scores and JCAHO survey scores
- No evidence of patient impact, although JCAHO has acted as a key driver in the development of hospitals' patient-safety initiatives
- Disconnection between outcomes measures and JCAHO evaluations

Nevertheless, the literature is also burgeoning with examples supporting the positive impact of accreditation on the quality of accredited organisations (Dearinger *et al*., 2010). De Walcque *et al*. (2008) refer to the experience of the last decade in healthcare showing that accreditation has been a valuable driver of quality improvement in many hospital settings. Sunol *et al*. (2009a) argue that those involved in accreditation projects are likely to believe accreditation can contribute to the improvement of healthcare and service quality. Chen *et al*. (2003) found that accredited hospitals performed better than non-accredited hospitals on a range of quality indicators. Non-surveyed hospitals had higher mortality rates than surveyed ones, albeit with considerable variation in their performance. Devers *et al*. (2004) found that a quasi-regulatory organisation (e.g. JCAHO) can be a primary driver for hospitals' patient-safety initiatives. Rooney and van Ostenberg (2004) stated that patient records designed to accreditation standards have greatly contributed to the improvement and monitoring of quality patient care. They also commented that accreditation could often serve as a comprehensive and powerful tool for quality improvement in cultures and countries with very different systems of healthcare delivery. Simons *et al*. (2002) found that hospitals providing a trauma programme consistent with accreditation criteria were statistically better than the other centres. El-Jardali *et al.* (2008) found that nurses perceived improvement in the quality of care in hospitals after accreditation and considered the accreditation as a valuable tool for improving quality of care. Hospital accreditation had a significant impact on hospitals' infection control infrastructure and performance (Sekimoto *et al.*, 2008). It has been argued that accreditation could predominantly promote compliance with the published standards in the months prior to the external assessment (Salmon *et* *al*., 2003; Piskorz, 2002) and/or increase the number of healthcare organisations interested in taking part in the accreditation scheme (Sutherland and Leatherman, 2006). However, there is little evidence that this high compliance and participation will bring any benefits in terms of clinical processes and outcomes or quality and safety in the accredited organisations (Sierpinska and Ksykiewicz-Dorota, 2002).

In view of the above-mentioned confusion and alleged failure of accreditation to enhance quality of care, some efforts have been made to improve the impact of accreditation. For instance, Scrivens (1997b) argued that, in order to make accreditation more acceptable to healthcare organisations, accreditation systems have to become more relevant to clinical activity. Thus, a handful of accreditation bodies have been introducing, developing, incorporating and monitoring clinical quality indicators in healthcare organisations (Collopy, 2000; Fairbrother and Gleeson, 2000). As a result, improvements have apparently occurred in the care outcomes of these organisations (Collopy, 2000; Collopy *et al*., 2000; Williams *et al*., 2005).

The term 'quality measures', includes the definitions of quality indicators, clinical indicators, key performance measures, or clinical performance measures. The link between quality measures and accreditation is complicated. Some research papers have failed to demonstrate a direct relationship between the quality measures and accreditation. No association was discovered between specified quality measures and the accreditation outcome (Dean Beaulieu and Epstein, 2002; Grasso *et al*., 2005; Griffith *et al*., 2002; Miller *et al*., 2005). One investigation indicated that increased compliance with accreditation standards had little or no effect on clinical indicator performance (Salmon *et al.*, 2003). A weak relationship between accreditation and quality measures was identified in another study (Hadley and McGurrin, 1988). Similarly, an association between health plan scores and accreditation was demonstrated (Dean Beaulieu and Epstien, 2002). However, in the same investigation, accreditation was found to be unrelated to patient satisfaction and patient-reported measures of quality.

The requirement by accreditation bodies for the development, implementation and monitoring of quality measures in healthcare organisations, has been long in existence. Even though quality measures are not essential in accreditation programmes, it has been demonstrated that some measures have improved care outcomes in health organisations

(Collopy 2000; Collopy *et al*., 2000; Gabriele *et al*., 2006; Silver *et al*., 2004; VanSuch *et al*., 2006; Williams *et al*., 2005; Williams *et al*., 2006). Likewise, involvement in an accreditation programme and a randomised clinical trial encouraged improvement in a clinical guideline that was used as a quality measure (Juul *et al*., 2005). However, another analysis demonstrated that the impact of quality improvement efforts was variable and often minimal (Borenstein *et al*., 2004). It has been argued that different quality measures that have been developed and implemented in diverse ways should not be expected to produce comparable outcomes (Gross *et al*., 2000).

Contradictory results were found when comparing quality indicator performance between accredited and non-accredited hospitals. The results of quality indicators from accredited hospitals could not be distinguished from those of non-accredited hospitals (Snyder and Anderson, 2005). Similarly, the results for medication errors could not be differentiated between accredited hospitals, non-accredited hospitals and nursing homes (Barker *et al*., 2002). Conversely, another analysis discovered that accredited hospitals had superior performance on a range of quality indicators than did non-accredited hospitals, even though there was substantial variation of performance between the accredited hospitals (Chen *et al*., 2003). There is evidence that healthcare organisations rapidly increase compliance with the published standards in the months prior to the external assessment and improve organisational processes but, there is less evidence that this is beneficial in terms of clinical process and outcome (Shaw, 2003). The proposed study endeavours to bridge the above research gap by using multiple methodologies, including time series analysis, to establish whether a causal relationship exists between accreditation and multiple quality measures (structure, process and outcome measures) over a 4-year period.

1.1.7.5 Change promotion

Some research studies demonstrate that accreditation may promote change in healthcare organisations (Duckett, 1983; Scrivens *et al*., 1995; Pomey *et al*., 2004; Juul *et al*., 2005). Duckett (1983) found that accredited hospitals showed significant changes in the organisation of nursing, physical facilities and safety after undertaking accreditation. The literature on change promotion is largely descriptive in nature and does not examine the impact of accreditation on objective outcomes. Pomey *et al*. (2004) report the changes instigated by the preparation stage of accreditation provided a climate conducive to fostering better treatment of patients in hospitals. This was a result of giving the professionals an opportunity to reflect more on their organisational practices and exchange their views with others. Pomey *et al*. (2010) also emphasised the role of the accreditation process as a driver of change in organisations. They indicated that most of the changes happened while organisations were preparing for the accreditation (Pomey *et al*., 2010).

The activity of preparing for and undergoing accreditation has been shown to promote change in health organisations (Duckett 1983; Scrivens *et al*., 1995; Juul *et al*. 2005; Pomey, *et al*., 2004). A two-year Australian observational study compared a group of 23 hospitals that applied for accreditation with hospitals which had not. The accredited hospitals demonstrated significant change in six areas, particularly in nursing organisation and facility safety (Duckett, 1983). A study of one organisation showed that change was stimulated by accreditation as it provided an opportunity for health professionals to consider current organisational practices. This compelled the organisation to change policy, introduce a continuous quality improvement programme and modify decision-making behaviours (Pomey *et al*., 2004). In a similar vein, accreditation programme participation and a randomised clinical trial preceded significant improvements in both the dissemination and quality of clinical practice guidelines (Juul *et al*., 2005). A literature review of the development of various accreditation programmes recorded their extensive impact both at a system level and on individual organisations (Scrivens *et al*., 1995).

Canadian research at two Quebec primary care centres investigated accreditation as a cultural control strategy (Paccioni *et al*., 2008). A multiple-case longitudinal study was conducted taking a mixed qualitative (14 semi-structured interviews in Institution A and 21 interviews in Institution B) and quantitative (retrospective data for 24 months) approach. The results showed that accreditation had little effect on the perceptions of employees not directly involved in the process. However, the accreditation process reinforced cohesiveness in the self-assessment teams. The study was limited because the period of observation was reduced due to large reform programme by the Quebec Department of Health. It is possible that the observed effects were the beginning of a stronger trend. In addition, the qualitative data were collected from administrators only, and quantitative data only from professionals and employees not directly involved in the process. The response rates were low (27.17 percent response rate before and after accreditation in Institution A and 46.83 percent in Institution B). As the study was conducted in primary care centres, results are not generalisable to hospitals.

Pomey *et al*. (2004) examined the dynamics of change that operated following preparations for accreditation in a French, 2113-bed university hospital. The design was a mixed method, retrospective longitudinal exploratory single case review with semi-structured interviews, questionnaires and focus groups conducted with professionals. The results showed that accreditation provided an opportunity to reflect on the operation of the organisation, enabled the introduction of a continuous quality programme and improved procedure documentation. Professionals viewed the preparations for accreditation as both bureaucratic and consensual. Self-assessment helped develop values shared by professionals in the hospital and the creation an organisational environment which was more conducive to fostering better treatment of patients. The study had limited generalisability due to the single case review setting and the questionnaires used were not tested for reliability or validity.

1.1.7.6 Organisational Impact

There is insufficient research on the organisational impact of accreditation. As documented by one study, there was no differentiation between accredited and non-accredited (rehabilitation) programmes (Mazmanian *et al*., 1993). Another investigation discovered improved outcomes after the accreditation of a trauma health service (Simons *et al*., 2002). A review of accredited hospitals in France revealed no significant differences in accreditation decisions according to hospital status and size (Daucourt and Michel, 2003). However, it was noted that larger hospitals received more frequent and serious recommendations.

As the consequence of participating in an accreditation programme, one study showed that improvements were made to patient care through the initiation of three organisational strategies (Sheahan, 1999). The author found that participation in accreditation facilitated improvements in the organisation of patient care through the coordination of a patient communication strategy, an evaluation strategy and a quality improvement strategy. A participative management style and organisational support for the accreditation process has been shown to affect the outcome positively (Peterson, 2003). Currently, there is a large-scale project in progress examining the relationship between accreditation and organisational performance (Braithwaite *et al*. 2006). Until its completion, Greenfield and Braithwaite (2008) maintain that the organisational impact of accreditation is somewhat ambiguous.

1.1.7.7 Cost of Accreditation

Quality programmes consume more resources than do most treatments (Øvretveit and Gustafson, 2003). James and Hunt (1996) assert that accreditation is a costly process. A variety of costs are attributed to this evaluation system, such as the direct cost of surveys and indirect implementation costs (Montague, 2003; de Walcque *et al*, 2008). Consequently, another segment of the literature has analysed the financial costs of accreditation for the aspirant accredited organisations (Greenfield and Braithwaite, 2007). Highlighting the costs of accreditation, Øvretveit and Ham (2002) state that evaluations should be used effectively, because they consume both time and money that can be utilised in other activities within organisations. Assessment of the financial costs of healthcare accreditation is under- researched. The few projects that have been conducted present contrasting evaluations.

Two studies questioned whether accreditation was an appropriate use of resources due to costs being high for an individual organisation (Fairbrother and Gleeson 2000; Rockwell et al., 1993). These studies found that the costs were too high for an individual organisation and questioned whether accreditation was a justifiable use of resources for high-quality patient care delivery (Rockwell *et al*., 1993; Fairbrother and Gleeson, 2000). The costs of accreditation in developing countries may be particularly unsustainable (Bukonda *et al*., 2003). The author affirmed that healthcare organisations were restrained by the costs of accreditation. An opposing viewpoint by Mihalik *et al*. (2003), states that costs incurred in accreditation should be perceived as an essential investment in sustaining quality and accountability, even though the authors did note the high costs of accreditation. Rooney and Barnes (2001) have also assessed the costs and effectiveness of implementing accreditation in two developing countries, South Africa and Zambia. Their research revealed that, despite the cost, accreditation could be beneficial in areas such as improved communication, compliance with organisational standards, better leadership and management of the facilities and improved staff and patient safety. Mays (2004) reports his consternation over the high costs incurred by healthcare organisations that undergo accreditation and warns that this might create significant barriers to accreditation for those under-resourced organisations that provide healthcare to disadvantaged communities. He contends that a comparison of costs versus benefits should be reviewed to determine the feasibility and value of accreditation.

A recent paper concluded there were no significant financial differences for organisations of different sizes and locations (Zarkin *et al*., 2006). However, the study only examined the costs for a specific health service (methadone treatment sites). The paper also reported that accreditation costs per-patient were substantially larger for small and rural organisations compared to medium to large and urban locations. Research such as that by Doyle and Doran (2007) sought to identify the cost of operating an acute hospital accreditation scheme (AHAS) in terms of human, financial and physical resources and to undertake a cost-benefit analysis of this scheme. Øvretveit and Gustafson (2003) supported by more recent reports (Braithwaite *et al*., 2010; Greenfield *et al*., 2012; Hinchcliff *et al*., 2012 and Mumford *et al*., 2013), nevertheless, indicate that there is a scarcity of evidence to show that accreditation is the best use of resources for improving quality of services.

1.1.8 Patient Evaluations of Care

1.1.8.1 Patient Satisfaction and Quality of care

Patient satisfaction is as important as conventional outcome measures such as mortality or functional status and therefore, a key parameter that is believed to reflect quality of care (Cleary et al., 1993). As a result, healthcare organisations perceive patient satisfaction as a factor that plays a critical role in a competitive healthcare market (Klotz et al., 1996). For Donabedian (1980), patient satisfaction is a fundamental measure of the quality of care because it offers information on the provider's success at meeting those expectations that are most relevant to the patient. Measures of satisfaction are, therefore, important tools for research, administration and planning.

Although gathering feedback from patients is a time-honoured practice, there is little empirical evidence on how it is best utilised for quality improvement. Several papers have reported improvements as the result of systematic gathering of patient feedback by hospitals (Draper *et al.*, 2001; Hildenhovi *et al.*, 2002; Crawford *et al.*, 2002; Gillies *et al.*, 2003; Reiber *et al.*, 2004; Sweeney *et al.*, 2005; Davies and Cleary, 2004; Richards and Coulter, 2007; Davies *et al.,* 2008; Bate and Robert, 2006; Forbat *et al.,* 2009). Additionally it is uncommon for patient feedback to include comments on the quality of care, and any improvements in quality that have resulted from feedback have been inconsequential. Moreover, ignoring patients' and relatives' criticisms has been noted in the literature as a crucial factor in failing hospitals (Department of Health, 2001; Colin-Thomé, 2009). Furthermore, there is an increasing trend in accrediting bodies requiring patient satisfaction surveys as part of their accreditation process. Intriguingly, it appears that the outcomes of satisfaction surveys do not have a significant influence on the accreditation decisions made by accrediting bodies (Auras and Geraedts, 2010).

1.1.8.2 Patient Satisfaction and Accreditation

Achieving compliance with accreditation standards requires resources and there needs to be justification for resource allocation and measurement of the return on investment made. Although straightforward accounting principles can be used to determine the costs associated with an accreditation process, so far no studies in the Middle East have compared key outcome parameters such as patient satisfaction between hospitals with or without formal international accreditation. The level of patient satisfaction has financial repercussions on the healthcare provider. This is largely due to satisfied patients being willing to return and to recommend the hospital to relatives and friends. Patient satisfaction is believed to be a key parameter that measures quality of care in a hospital setting (Cleary *et al*., 1993; Guzman *et al*., 1998; Nelson-Wernick *et al*., 1981). Only a few investigations have been conducted on the subject of hospital accreditation and patient satisfaction. As emphasised by Greenfield and Braithwaite (2008), there is limited data on the influence of hospital accreditation on patient satisfaction. The existing studies (Heuer, 2004; Fong. *et al*., 2008) have major limitations, i.e. small sample sizes or use of non-validated instruments to assess patient satisfaction.

The available research shows no relationships between accreditation and patient satisfaction (Greco *et al*., 2001; Heuer, 2004). For example, a cross-sectional retrospective examination of the relationship between 41 New Jersey and Eastern Pennsylvania acute care not-for-profit hospitals' accreditation scores and patient satisfaction ratings revealed no association between them (Heuer, 2004). Salmon *et al.* (2003) also found no difference in the effect of accreditation on patient satisfaction between intervention and control groups. Similarly, another cross-sectional experiment found that patient-reported measures of quality and satisfaction of both accredited and non-accredited health plans could not be differentiated (Beaulieu and Epstein, 2002). Both these papers utilised secondary data from professional bodies' database that could not be modified to fit the study design.

In a quasi-experimental cluster Egyptian study involving 30 NGO units already submitted for accreditation and 30 pair-matched units not programmed for accreditation, mean patient satisfaction scores were significantly higher among the accredited non-governmental health units regarding cleanliness, waiting area, waiting time, unit staff and overall satisfaction. No significant differences were found in provider satisfaction except for the overall satisfaction score. (Al Tehewy *et al*., 2009). Hospitals differ from primary healthcare centers in terms of complexity and diversity of services. This may explain the discrepancy between satisfaction results at the hospital level and the NGO unit study. Thus, this study cannot be generalised to the hospital setting. Furthermore, the study used descriptive statistics only to describe the patient population and did not analyse the effect of confounding patient level variables on patient satisfaction. Our thesis will resolve this limitation by calibrating regression models on all patient level variables and patient experience scores. Although Al-Tehewy *et al*. (2009) found a short-term positive effect; the study was limited as it did not include pre-accreditation measures. The authors thus recommend the use of controlled pre- and post-designs for future research on the impact of accreditation on the health services. This thesis has responded to the above call by using a time series analysis of quality measures, one year pre-accreditation and three years post accreditation, in order to evaluate whether a causal relationship exists between accreditation and quality measures.

In Germany, Sack *et al*., (2010) conducted a cross-sectional survey of inpatient satisfaction (measured by the recommendation rate) and accreditation status. Data from 3,037 patients (response rate of 55%) were collected from 15 accredited and 10 non-accredited cardiology units. Different control variables (such as staffing levels) were considered. The Picker survey was used. There were no significant difference between the recommendation rate and satisfaction of care between accredited and non-accredited groups. However, the study did not test for associations between patient demographics and hospital characteristics as confounding variables influencing patient satisfaction. The hospitals studied had just received accreditation and, therefore, the full benefits may not have yet emerged. The individual accreditation programmes varied with respect to scope and standards and these differences between the two accreditation programmes were not considered. The focus of the study on cardiology units begs the question as to whether the results could be replicated if the study was conducted within another medical discipline.

A second German cross-sectional experiment was conducted by Sack *et al*. (2011) using a prospective design examining the association between hospital accreditation and patient satisfaction. The sample was large involving 73 hospitals (n=37,700 inpatients). The Picker Inpatient questionnaire was used (Picker Institute, 2009). There was no significant difference for the recommendation rate between accredited and non-accredited hospitals. The results supported previous notions that accreditation is not linked to quality of care as measured by the patient's willingness to recommend. The results were limited as some hospitals had completed accreditation or re-accreditation recently.

There is clearly an essential need for further research to uncover more evidence regarding the impact of accreditation on patient satisfaction. While the association between patient evaluations of care and accreditation is under-researched, the limited studies available have found no relationships (Dean Beaulieu and Epstein, 2002; Heuer, 2004; Greco *et al*., 2001). An analysis of the relationship between not-for-profit hospital accreditation scores and patient satisfaction ratings found no association, either summatively or formatively (Heuer, 2004). Likewise, there was no differentiation between accredited and non-accredited health plans in terms of patient-reported measures of quality and satisfaction (Dean Beaulieu and Epstein, 2002). There has been comparison of patients' and health professionals' perceptions regarding compliance with accreditation standards. Although there were differences in specific details, the satisfaction rank order correlations for the two groups were very similar (Durieux *et al*., 2004). The results of a survey of patients during the accreditation of general practices revealed that patients scored doctors' interpersonal skills higher than practice issues (access, availability and information availability) (Greco *et al*., 2001).

1.1.8.3 Patient satisfaction

Patients' views on healthcare performance are conventionally retrieved through the measurement of what is termed 'patient satisfaction' (Coulter *et al*., 2009). A criticism of this measurement is that satisfaction is an ill-defined and often abstract concept for which there is no standardised measure (Carr-Hill, 1992; Hall and Dorman, 1988; Sitzia and Wood, 1998; Fitzpatrick, 1991; Fitzpatrick, 2000; Fitzpatrick and Hopkins, 2000; Edwards and Staniszewska, 2000; Cleary and McNeil, 1988; Cleary, 1999). As satisfaction is multi-dimensional in nature, there is no consensus about exactly which domains are most important and should be included in surveys. Patient satisfaction is sometimes treated as an outcome measure (satisfaction with health status following treatment) and sometimes as a process measure (satisfaction with the way in which care was delivered) (Coulter *et al*., 2009). According to the UK Department of Health (2009) satisfaction ratings reflect at least four factors:

1. the personal preferences of the patient
2. the patient's expectations
3. response tendencies due to personal characteristics
4. the quality of the care received (Sitzia and Wood, 1998; Hargraves *et al.*, 2001; Zaslavsky *et al.*, 2000; Zaslavsky *et al.*, 2001; Staniszewska and Ahmed, 1999; Staniszewska and Ahmed, 2000; Jackson *et al.*, 2001).

Patient expectations can also be influenced by cultural norms and by health status. The influence of expectations, experience, and satisfaction is particularly challenging when patients' views are used to make comparisons about the performance of healthcare organisations or providers (Coulter *et al*., 2009). Research has shown systematic differences between the views of the public (healthy people/potential patients) and the views of current users of health services (Appleby and Rosete, 2003; Edwards, 2006). Patients may be categorised by several factors including ethnicity, age, gender, chronic versus acute, disease severity, and so on. Patients' experience of healthcare is most likely to be affected by their expectations, their concerns and their knowledge of/relation to/dependency on healthcare providers (Coulter *et al*., 2009). Although patient satisfaction has been measured for many years by healthcare organisations, the value of such efforts has been limited (Cleary, 1999). Surveys have tended to focus on managers' or clinicians' agendas rather than on the issues that are most important to patients. Furthermore, surveys are frequently too broad to produce actionable results. Many academics believe that the complexities of modern healthcare and the diversity of patients' expectations and experiences cannot be reliably evaluated by asking general rating questions such as 'How satisfied were you with your care in hospital X?' or by focusing solely on food and amenities while ignoring patients' concerns about their illness and clinical care (Coulter *et al*., 2009). Patient's satisfaction ratings may be high despite evidence to the contrary and are of little use to managers in identifying problem areas (Fitzpatrick, 1991). The use of 3 point or 4-point Likert scales also biases results and contributes towards higher ratings. Patient satisfaction surveys limit feedback to the patient's perception of care instead of the actual care provided. While global satisfaction ratings may be beneficial when monitoring trends over time, they can be deceptive if patients are not encouraged to provide detailed feedback on their experience of care. In general, patient satisfaction surveys are ineffective in the identification of areas that necessitate improvement in the quality of care

'Attitudes to services do not tell us very much about the nature of those services. Surveys of patient satisfaction tend to elicit very positive ratings which are not sensitive to specific problems in the quality of care delivery.' (Jenkinson *et al*., 2002a)

Although the measurement of patient satisfaction became universal two decades ago, there was frequent criticism due to the methodological weaknesses and theoretical challenges inherent in such measures (Hall and Dornan, 1988; Aharony and Strasser, 1993; Carr-Hill, 1992; Williams, 1994; Draper and Hill, 1995; Sitzia and Wood, 1997). The theoretical and methodological issues identified were:

- There is limited consensus on the multiple dimensions of patient satisfaction particularly in terms of the implications of the overall satisfaction ratings.
- Even though patient satisfaction ratings are generally high, there are frequent discrepancies between the overall satisfaction ratings, and the same patients' feedback of certain attributes of their experience of care (Draper and Hill, 1995).
- Patient satisfaction surveys primarily measure aspects that are of concern to healthcare managers and clinicians as opposed to those of importance to the patients.
- Satisfaction ratings are influenced by the individual preferences of the patient and the patient's expectations and the care received.
- Satisfaction surveys have demonstrated systematic biases that are linked to patient characteristics. For example, older patients have higher ratings than younger patients and wealthier patients are generally less satisfied than patients with a lower socio-economic status.

3.1.1.1 Moving from measuring patient satisfaction to measuring patient experience

It is the foremost recommendation of researchers that patient opinion should supplement quality indicators in healthcare (Avis, 1997; Cleary and McNeil, 1988; Donabedien, 1988). Patient satisfaction surveys are commonplace in healthcare organisations but healthcare managers are frequently unaware of the differences between patient satisfaction and patient experience. It is only recently that patient-reported experience measures (PREMS) have become a topic of interest and they remain under-researched. These concepts are described below.

3.1.1.2 Patients' experience

The identified weaknesses of patient satisfaction surveys have inspired a move to measuring patients' experience as an alternative to satisfaction (Cleary and McNeil, 1988; Cleary *et al* 1992; Cleary, 1998). 'Traditionally, assessments have ignored the reports of patients in preference to technical and physiological reports of outcome' (Jenkinson *et al*., 2002a). Consequently there has been increasing interest in the assessment by patients of not only their treatment but also their wider experience of care (Cleary *et al*., 1991).

According to the Picker Institute (2009), patient satisfaction questions elicit subjective responses, in the form of ratings on a scale (from 'poor' to 'excellent', for example). In addition they have been found to be unreliable, and they do not provide specific factual information that can be used to improve quality. One response to these criticisms has been the development of survey approaches that assess actual patient experiences. Patients are asked to report in detail on their experiences by asking them specific questions about whether or not certain processes or events occurred during their healthcare encounter. It is argued that this enables a more direct link to actions required to improve quality (Cleary, 1993). This is one of the underlying philosophies of the Picker organisation. A qualitative research programme involving researchers at Harvard Medical School was implemented to identify what patients' value about their experience of receiving healthcare and what they considered unacceptable. The programme identified seven core domains dimensions of inpatient care: doctors, nurses, treatment with respect and dignity, consistency and coordination of care, cleanliness, pain control and involvement in decisions (Jenkinson *et al*., 2002). The Picker approach (based on these seven dimensions) has subsequently formed the basis of the United Kingdom's NHS patient survey and was adapted for some surveys in Australia.

Another important international initiative is the development of the Hospital-Consumer Assessment of Health Plans Survey (H-CAHPS) in the United States (Darby *et al*., 2005). The Consumer Assessment of Health Plans (CAHPS) was originally developed for assessing health insurance plans. The US Agency for Healthcare Research and Quality (AHRQ) provided the resources and developed this scientifically based survey. The CAHPS project was first published in 1995 accompanied by information that supported the survey design process. CAHPS instruments typically undergo iterative processes of cognitive testing, rigorous field assessment, and process and outcome evaluations in the applicable settings (Hays *et al*., 1999). Instruments are revised after each round of testing (Medical Care Supplement, March 1999, 37(3), which is devoted to CAHPS). Numerous CAHPS instruments were consequently implemented across the US.

The H-CAHPS initiative emerged following a request from the Centers for Medicare and Medicaid who identified a need for a hospital based survey that would produce comparative information on which patients would base their choice of hospital. This initiative was also used to encourage accountability among hospitals for their care delivery. Whilst the main purposes of H-CAHPS are consumer choice and hospital accountability, AHRQ states that the instrument could also provide a foundation for quality improvement. The H-CAHPS survey captures reports and ratings of patients' hospital experience (McGee *et al.*, 1999). AHRQ has indicated that:

… as indicated in the literature, patient satisfaction surveys continually yield high satisfaction rates that tend to provide little information in the way of comparisons between hospitals. Patient experiences tend to uncover patient concerns about their hospital stay, which can be of value to the hospitals (in quality improvement efforts) as well as consumers (for hospital selection).

According to the Australian Productivity Commission (Pearse J., 2005), patient experience surveys ask service users specific factual questions about what happened to them during their recent healthcare experience. For example, ‘reporting’ style questions such as:

Did a member of staff tell you about medication side effects to watch for when you went home?

provide useful information because they highlight precisely where the problems are, and what needs to be done to improve particular elements of patient care. Traditional ‘satisfaction’ or ‘rating’ style questions, such as:

Overall, how would you rate the care you received?

are considered less useful because they do not provide a clear indication of what needs to be done to improve care.

Draper and Hill (1995), have documented several major national and international developments in the area of patient experience. In particular, five Australian States have invested in developing on-going programmes for surveying patient experience. The British National Health Service (NHS) has adopted a national approach to surveying patient experience. More recently, the United States’ centres for Medicare and Medicaid have announced that all US hospitals participating in the Medicare Programme (which is effectively all US hospitals) will be surveyed using a standardised instrument - Hospital-Consumer Assessment of Health Plans Survey (HCAHPS).

The use of patient experience surveys can have diverse purposes: describing healthcare from the patient’s point of view; measuring the process of care, thereby both identifying problem areas and evaluating improvement efforts and evaluating the outcome of care (Tarlov *et al*., 1989; Donabedien, 1966; Sitzia, 1997). While there are a numerous published papers available on patient satisfaction in healthcare, few research papers have focused on a patient experience which identifies a major research gap which will be addressed in this dissertation. There are no published articles on patient experience and accreditation and limited articles on patient satisfaction and accreditation. Also, research conducted in this area has often focused on patient experience in specific contexts, such as shared decision-making, older adults, mental health or chronic illness, which makes it difficult to replicate findings or generalise the outcomes to other settings.

1.1.9 Literature Summary

Despite the longevity of accreditation as an approach to improving quality in healthcare and the substantial worldwide financial investments in accreditation (Appleyard *et al*, 2008), there is a paucity of empirical research that has examined the organisation-wide implementation and subsequent impact arising from it. When commencing this literature review, the author was able to find only a limited number of articles within the current body of literature, examining this subject area in an acute care hospital. Furthermore, the author has attempted to provide a balanced view of the healthcare accreditation literature. This section summarises the benefits and criticisms of healthcare accreditation.

1.1.9.1 The claimed benefits of accreditation

Literature supports accreditation as a framework for the development and implementation of systems and processes that not only improve operational effectiveness but also increase positive health outcomes (LTCQ Inc., 2002; Salmon, 2003; René, 2006; Davis, 2007; Greenfield and Braithwaite, 2008; Lanteigne, 2009). The synopsis of the claimed benefits of accreditation includes:

- The improvement of collaboration and communication among internal and external stakeholders (René, 2006; Bird, 2006; Werner, 2005; Greenfield and Travaglia, 2007; Gluck, 2001; Heaton, 2000; El-Jardali, 2008)
- The enhancement of interdisciplinary team effectiveness (Sutherland, 2006; NCQA, 2007; Simons, 2002; Shaw, 2003; El-Jardali, 2008; Pomey and Lemieux-Charles, 2010)
- An indication of the organisations commitment to quality from an external authoritative body (Baldi, 2000; Griffith, 2002; Salmon, 2003; Devers, 2004; Mays, 2004; Sutherland, 2006; Beaumont, 2008; Greenfield, Pawsey and Braithwaite, 2008; Auras and Geraedts, 2010; Peter *et al.*, 2010)
- Assistance in the recognition of areas where additional funds are required for healthcare organisations and justification for funding negotiation. Reduced liability costs (Mays, 2004; Gluck, 2001; Baskind, 2010; Peter *et al* 2010).
- A risk mitigation strategy for medical errors (Pagliarulo, 1986; Grachek, 2002; Griffith, 2002; LTCQ, Inc., 2002; Simons, 2002; Chen, 2003; Leatherman, 2003; Salmon, 2003; Mays, 2004; René, 2006)

- A framework for sustaining quality improvement and organisational performance (Chen, 2003; Leatherman, 2003; El-Jardali, 2008; Lanteigne, 2009)
- An on-going self-assessment of organisational performance based on accreditation standards (Mays, 2004; Montagu, 2003; Sutherland, 2006; Werner, 2005).
- Certification that the quality among healthcare providers is at an acceptable level (LTCQ Inc., 2002; Montagu, 2003; Mays, 2004; René, 2006)
- Helping organisations understand the importance of the continuum of care (LTCQ Inc., 2002)
- Enhancing public awareness of the organisation's quality of care and improves its reputation with end-users (Montagu, 2003; Mays, 2004; Bird, 2005; René, 2006; El-Jardali, 2008; Greenfield *et al.*, 2008), as well as their overall satisfaction level (Al Tehewy, 2009).
- Encouragement of professional development, capacity-building and the creation of a learning organisation (Pagliarulo, 1986; Baldi, 2000; Gluck, 2001; LTCQ, Inc., 2002; Montagu, 2003; Shaw, 2003; Mays, 2004; Pomey, 2005; Newhouse, 2006; René, 2006; Beaumont, 2008; Greenfield and Braithwaite, 2008; Lanteigne, 2009)
- Reduction in variation of clinical care (Salmon, 2003; Lewis, 2007)
- Providing a framework for sustaining continuous quality improvement in relation to quality improvement initiatives, policies, and procedures (Chen, 2003; Leatherman, 2003; Montagu, 2003; Salmon, 2003; Mays, 2004; Sutherland 2006; El-Jardali, 2008; Greenfield and Braithwaite; 2008; Lanteigne, 2009; Baskind, 2010; Peter *et al.*, 2010)
- Improvement of internal processes and practices due to the accreditation methodology (Pomey, 2010)
- Facilitation of an organisations' compliance with quality and safety standards (Al Tehewy, 2009; Peter *et al.*, 2010)
- Association with some improvements in clinical outcomes (Thornlow and Merwin, 2009)
- Fostering team-building among healthcare staff as accreditation facilitates cross-functional collaboration (Davis, 2007)
- Increasing the understanding of each staff members' contribution to the healthcare organisation's mission and services (Davis, 2007)

- Enhancing staff satisfaction among doctors, nurses, and other healthcare providers (Lin, 2008; Al Tehewy, 2009)
- Producing a ripple effect, whereby the accreditation of one service helps to improve the performance of related service areas (Peter *et al.*, 2010)
- Emphasising areas of best practice (Baskind, 2010)
- Stimulating knowledge translation in terms of sharing of policies, procedures, and best practices among healthcare organisations (Davis, 2007).

1.1.10 Criticisms of Accreditation

The preceding section endeavoured to provide an insight into the claimed benefits for implementing accreditation. There are, however, also criticisms of accreditation in the literature. At a rudimentary level, Milakovich (1991) argues that accreditation may actually fail in its efforts to improve the quality of care. With specific reference to the Joint Commission approach in the US, he posits that accreditation represents an ineffectual model for improving quality across the organisation and serves to create passive resistance or overt opposition from hospital staff. According to him, accreditation is perceived as regulating the procedures within the organisation, and in order to contain costs, healthcare services are reduced. This position is acknowledged by Scrivens (1995b) who posited that accreditation is regarded as an external approach towards quality improvement, as opposed to an internal organisational approach. Gaster and Squires (2003a) suggest that the external monitoring process on which accreditation is based *'…may be felt mainly as an irritant and a diversion from doing the 'real job''* (p.87) in a healthcare organisation. They further purport that the process may be divisive as it may mean that the organisation is labelled a failure by virtue of its accreditation rating. This view is shared by Natarajan (2006) who notes that the accreditation approach may be interpreted as punishing organisations as a result of non-compliance. Moreover, Sewell (1997) observes that *'Accreditation is often viewed as a necessary evil'* (p.21) and that it has the potential to develop into *'…a paper-chase exercise'* (p.21), with no guarantee of improving quality and that it is built around rigid standards and integral criteria that fail to address the service outcomes of patients.

In a similar questioning vein, Braithwaite *et al*. (2006) question whether the accreditation approach is worthwhile and justified, given that research into its effectiveness (in terms of quality clinical and organisational performance) is at an embryonic stage and, in particular, that the espoused benefits are underpinned by a very limited body of empirical evidence. Given that most healthcare organisations are subject to funding constraints, they suggest that the implementation costs of accreditation may be considerable and, as such, represent a drain on already scarce resources. Citing approximate costs, based on US data from 2003, they note that annual costs for a medium-sized organisation might run to $630,000 per annum, while first year costs, including the initial survey, would add an additional $370,000. The significant costs associated with the initial implementation of accreditation have been previously recognised by Redmayne *et al*. (1995), Steiner *et al.*, (1995) and Hurst (1997), although Hurst (1997) qualifies this by arguing that savings will be made in the long run if accreditation uncovers unsafe and inefficient practices. Finally, Pomey *et al*. (2005, p.52) observe that accreditation will fail in its ability to generate organisational change and quality improvement where its implementation is weak. Instead it has the potential to become *'…an essentially bureaucratic exercise that will not serve thoroughly to review organisational processes in order to improve structures and treatment modalities as a whole'*.

1.2 **Literature Synthesis**

1.2.1 Gaps in the Literature, Contribution of the Research and Significance of the Study

While appreciating the contributions from the abovementioned authors, it is noted from the above literature review that there is an overall paucity of empirical studies and related literature in the area of hospital accreditation. This is especially evident in relation to the implementation process and the impacts arising at the individual patient and organisational levels. This research seeks to respond to this gap and make a contribution to the knowledge and understanding of these issues, from the perspective of the impact of accreditation on quality measures and patient experience. This will also contribute to the existing empirical research relating to international healthcare accreditation by offering a UAE perspective, both in general and specifically in the hospital context.

The following discussion aims to capture the calls for research in both quality and accreditation implementation and associated impacts that have been made within the literature. Moreover, it also seeks to acknowledge that the existing literature identifies the scope for further research that is longitudinal in nature, incorporating time series methodologies and focusing on the effects of accreditation over time. On the basis of this, the author will endeavour to identify the contributions that this thesis will make to the knowledge and understanding of these issues. According to Babbie (2004), longitudinal analyses ‘are often the best way to study changes over time’ (p.102). Such a design has an advantage over the cross-sectional design which, according to Bowling (2002), can only point to statistical associations between variables which cannot alone establish causality. Accordingly, cross-sectional designs cannot prove causation between accreditation and improvements in an organisation’s quality measures. Longitudinal studies are recommended because they enable causal relationships between variables to be determined.

The absence of research and understanding of the field of accreditation and its subsequent impact has been noted by a number of commentators. Ovretveit and Gustafson (2003b) argue that, in relation to accreditation in healthcare, there is a lack of empirically-based research relating accreditation and quality measures. Furthermore, Ovretveit (2003b) observes that much of the research originating in the United States is conducted within a private hospital/healthcare context and, as such, cautions on the extent to which conclusions may be transferred to other geographical areas and publicly funded healthcare organisations. Most research on the contextual effects of accreditation in healthcare has focused on developed countries (Broadbent *et al*., 2001; Modell, 2001; Mannion *et al*., 2005; Agrizzi, 2008; Chang, 2006), leaving developing countries largely unexplored. The organisational context of a developing country, addressed by this research, has been largely overlooked by the mainstream accreditation literature. In relation to this thesis, the author has been cognisant of these observations and is seeking to respond by focusing the analysis on the quality measures and patient experience using approaches described below.

First, with reference to the impact of accreditation, there have likewise been calls for research to actively address these issues. Adinolfi (2003) has argued that much of the literature in the quality in healthcare field is prescriptive and simply reports on quality approaches with little consideration of the organisation-wide impacts. Similarly, Walshe *et al*. (2001), while acknowledging the fact that accreditation is widely used, note the absence of research on its impact has meant that it is not well understood. As further evidence of the relevance of this aspect of the research, Braithwaite *et al*. (2006) have recently noted that investigations into the effectiveness of accreditation are still at an embryonic stage and in particular, that: *'After decades of accreditation development in health, and multi-million euro, dollar and pound investments, the extent to which accreditation processes and outcomes accurately reflect and motivate high quality clinical and organisational performance is poorly understood and under-investigated'* (Braithwaite *et al*. 2006 p.2). Moreover, they note the imperative and value of exploring this area: *'Researching the impact of accreditation on individual and organisational performance is an important undertaking'* (Braithwaite *et al*. 2006 p.8). Therefore, this thesis aims to respond to these calls by exploring *the individual (patient experience) and organisational impacts* arising from accreditation.

Second, accreditation is argued to be the most ubiquitous quality improvement tool used in healthcare (Heaton, 2000; Shaw, 2000). Whilst it is set up to evaluate healthcare organisations, its performance also needs to be assessed to both maintain its alignment with the initially determined objectives (Smith *et al*., 2008; Broadbent and Laughlin, 2009) and improve its merits and capabilities to continuously detect deficiencies in quality (Stufflebeam, 2001; Shaw, 2003a). The critical nature of healthcare processes and outcomes, as discussed earlier (Montague, 2003; Gauld, 2005), and the high cost of accreditation programmes for both those running and being evaluated by these programmes (James and Hunt, 1996; Cerqueira, 2006) reinforce the necessity for assessing their performance. Previous research on the performance and impact of healthcare accreditation shows mixed and inconsistent results (Greenfield and Braithwaite, 2008; Nicklin and Dickson, 2009). Accordingly, there has been an extensive call in healthcare literature for a rigorous assessment of such external accreditation systems to produce a rigorous analysis of their impact (Mannion *et al*., 2005; Øvretveit and Gustafson, 2003; Chuang and Inder, 2009; Walshe, 2007; Grol *et al*., 2007; Greenfield and Braithwaite, 2009). Adopting relevant methodological frameworks (time series analysis and case studies which are triangulated by cross-sectional studies), the current study seeks to satisfy the abovementioned call. In addition, I have adopted a time series framework because it is essential for testing causal relationships between an intervention (accreditation) and a range of quality measures. Cross-sectional studies, by contrast, are only able to establish associations between an intervention and outcomes which may not imply a causal relationship.

Thirdly, the existing literature has also highlighted the scope for alternative methodologies to be adopted in investigations on quality in healthcare. Babbie (2004, p.

102), purports that longitudinal analyses are a superior method to study the effects of an intervention over time. Bowling (2002, p. 198) considered this method 'of value for studying the effect of new intervention . . . as greater precision will be obtained when measuring change than with a series of cross-sectional surveys'. This research has adopted a design based on a longitudinal analysis to track the effect of the intervention (implementation of the JCI standards). It also uses methodological triangulation, which is a combination of methods to 'overcome the deficiencies that result from the use of one method' (Denzin, as quoted by Bowling, 2002, p. 202).

Fourth, research gaps have been identified in the literature review which include conflicting conclusions in the areas of hospital accreditation and its impact on quality. Additionally, there are limited reports in the area of consumer views or patient satisfaction. All of the research testing for the association between accreditation and patient satisfaction, (Beaulieu and Epstein, 2002; Heuer, 2004; Greco *et al*., 2001) lacked the methodological rigor (e.g. adequate sample size and validated survey instruments) required to generate substantive conclusions. This dissertation is, therefore, designed to fill these research gaps. Furthermore, evidence of originality is afforded in the setting as this will be the first research in the field of healthcare accreditation to be conducted in the UAE. In addition, contribution by the discovery of new facts may emerge through the research objectives on the determinants of patient experience in the UAE.

Finally, the thesis will contribute to practice and policy, particularly as accreditation is now the primary vehicle for improving healthcare quality in acute-care hospitals, in the UAE. This research aims to contribute to a greater understanding of accreditation and the associated patient experience and organisational impacts for those working within the health services sector. Furthermore, it may be of particular interest to those charged with managing the accreditation process itself and also to policy-makers and funders of public health services, both in the UAE and elsewhere. The outcome of the study may be of value to healthcare executives and regulatory authorities. The results of the research could influence the Health Authority's decision-making on the implementation of an appropriate accreditation system for the Emirate of Abu Dhabi. Based on the findings of this study, healthcare executives will be able to justify the resource requirements for accreditation or, alternatively, seek other methods of improving quality in their respective hospitals. Healthcare providers /managers could use the patient experience results to target patient groups at risk of having negative experiences in the hospital; for example, women, young patients, patients admitted through emergency rooms. Efforts and programmes to improve the quality of care may have different foci, targeting specific patient groups, instead of a systematic general patient programme. Such findings could have important implications for restructuring health plans to meet consumer needs and preferences more effectively. The emphasis can then be put on factors that health providers/managers can alter, like the streamlining processes, achieving accreditation or optimizing clinical care.

The Health Authority-Abu Dhabi emphasises consumer choice and competition among healthcare payers (insurers) and healthcare providers. Therefore, healthcare providers have to negotiate with payers about price while justifying the quality of purchased care. This makes for a competitive environment whereby positive patient experience could be the primary driver for increasing and retaining market share. Both payers and patients could use patient experience ratings to select healthcare providers. Since the results of patient experience surveys are in the public domain, this gives patients the opportunity to make informed decisions about a healthcare organisation. These developments require improvement of current quality measures including that of patient experience, which will be addressed in this research. Areas requiring further exploration include:

- Ensuring the accuracy and completeness of data collection through the accreditation process (Lewis, 2007; Pagliarulo, 1986);
- Highlighting consistency and compliance with standards over an individual organisation's performance and innovation (Lewis, 2007);
- The necessity for research to establish a strong association between accreditation status and patient outcomes (Dean Beaulieu, 2002; Barker, 2002; Greenfield and Braithwaite, 2009; Greenfield *et al*., 2009);
- Requirement for standardisation in surveyors' approach to increase survey reliability (Greenfield et al., 2009);
- Reduction in the workload required to comply with accreditation standards is necessary to increase adoption;
- Analysis of doctor and patient involvement in healthcare accreditation and quality improvement (Pomey, 2010; Braithwaite, 2010);
- Review of approaches, other than accreditation, for the assessment and promotion of healthcare quality (e.g., information technology and public reporting of performance

measures) (Lewis, 2007; René, 2006; Griffith, 2002; Miller, 2005; Jaafaripooyan *et al*., 2011)

1.2.2 Methodological gaps from empirical research

Accreditation is difficult to evaluate, as the endpoints of accreditation are hard to define and vary according to the expectations of users and customers (Shaw, 2003). Reasons for the lack of evaluation research include the methodological challenges of measuring outcomes and attributing causality to these complex, changing, long-term social interventions to organisations or health systems, which themselves are complex and changing (Øvretveit and Gustafson, 2002). A review of the current evidence on the impact of accreditation revealed some methodological issues, such as lack of strong research designs, selection bias, measuring quality and the lack of evaluating outcomes. There is a need for stronger research designs in order to build the evidence base on accreditation. Only two papers on accreditation were designed as randomised control trials; six other studies had pre- and post-test data but no comparison group; ten other investigations had group comparisons with no pre- and post-test data. More evidence on the impact of accreditation on patient experience and organisational level quality outcomes is needed. Randomised control trials and ex- post facto quasi-experimental studies could compare pre-accreditation and post-accreditation data from accredited and non-accredited organisations.

The literature suggests that accreditation programmes appear to improve the structure and process of care, with a limited body of evidence showing that accreditation programmes improve clinical outcomes. However, this literature base is fraught with methodological weaknesses. Most of the literature reviewed, used cross-sectional studies (one point in time) and/or comparative static analysis of data at two points in time (Salmon *et al*., 2003; Bukonda *et al*., 2003; Sekimoto *et al*., 2008; Chandra *et al*. 2009; Thornlow and Merwin, 2009; Al Awa. *et al*., 2011; El-Jardali *et al*., 2008; Sack *et al*., 2010; Paccioni *et al*., 2008). Due to the dynamic nature of accreditation, this method of data collection is not sufficient to analyse the impact of accreditation over time. Longitudinal designs have an advantage over the cross-sectional designs, which can only point to statistical associations between variables; they cannot alone establish causality. Additionally, accreditation is a process of continual improvement, thus in order to rigorously test the impact of accreditation, it is necessary to investigate change over time, which cross-sectional and comparative static analyses are incapable of doing.

Moreover, a before and after comparison, or comparative static analysis will only provide a snap shot of the impact of accreditation and will also neglect the effect of time as the benefits of accreditation may only emerge after the accreditation survey. Thus, this dissertation will bridge the above methodological gaps by using a four year time series analysis of multiple quality measures during the periods before and after accreditation (through a month by month comparison).

Research that did demonstrate improvements in quality measures and patient satisfaction could not be generalised to acute care settings as it focused on a specific measures (e.g. AMI measures), types of services (e.g. cardiology) and organisations (e.g. teaching hospitals) (Chen *et al*., 2003; Al Tehewy *et al*., 2009; Sekimoto *et al.*, 2008; Chandra *et al*., 2009; Thornlow and Merwin, 2009; Verstraete *et al.*, 1998; Al Awa *et al*., 2011; El-Jardali *et al*., 2008; Sack *et al*., 2010; Paccioni *et al*., 2008).

Selection bias is another methodological challenge for researching accreditation. Organisations that have little chance of meeting accreditation standards may simply choose not to apply for accreditation (Mays, 2004); organisations that already have superior performance may be applying for accreditation (Heras *et al*., 2002). As a result, 'the pool of organisations that seeks accreditation can become skewed toward organisations most likely to meet accreditation standards' (Thornlow and Merwin, 2009; Mays, 2004, p. 15). This could make it difficult to distinguish selection effects from the actual effects of accreditation (Mays, 2004). Hence, in all accreditation studies, including cross-sectional and comparative static analyses, the control of confounding variables related to the hospital characteristics and careful selection of quality measures is fundamental. Another factor that may diminish the effects of selection bias is when certain legislation and policies make accreditation mandatory, thus requiring all organisations to apply for accreditation irrespective of their ability to achieve accreditation. This is much like the UAE, where the Health Authority licensing process is based upon the JCI standards, thus making compliance with the standards mandatory.

Most research evaluating the impact of accreditation on quality measures utilised secondary data (Beaulieu and Epstein, 2002; Heuer, 2004; Thornlow and Merwin, 2009). While use of secondary data in cross-sectional studies is economical, it may limit the study design and contain potential bias if the data is self-reported. Therefore, the researcher has opted to support the use of secondary data with primary data collection using time series analysis and administering a patient experience survey. This will allow the researcher to modify the data collection to the aims of the thesis and also to control for the effects of confounding variables which is not always possible in secondary data.

The field of accreditation is still under-explored (Miller, 2005). Accreditation programmes vary in approach and content, thus comparisons are at times difficult or inappropriate (Shaw, 2003). While there is no conclusive evidence about the direct impact of accreditation on patient outcomes, there is some indication that if accreditation strengthens interdisciplinary team effectiveness and communication and enhances the use of indicators leading to evidence-based decision making, then it contributes to improving health outcomes (Beaumont, 2002). Few studies have been able to draw causal inferences about the direct influence of accreditation on patients' health outcomes because they have not conducted a dynamic analysis of the intervention (Hort *et al.,* 2013). This research directly addresses this issue by adopting time series framework.

In view of the above, the author has elected to use a time series analysis, one year before and three years after the implementation of accreditation, in order to draw causal inferences between accreditation and its impact on quality measures. No previous research have used this methodology as it is difficult to maintain a controlled environment during the period of study. However, the hospital analysed did not undergo any significant organisational changes for the years 2009, 2010, 2011 and 2012. Thus the leadership, organisational structure and the scope of services remained the same. Furthermore, a panel of quality experts carefully selected 27 quality measures that will reflect structures, processes and outcomes of care. In addition, this study will take into account the hospital level and patient level confounding variables. Finally, the time series analysis will be triangulated with cross-sectional study of acute care hospitals in Abu Dhabi and the patient experience case study of Al Noor Hospital.

1.3 **Foundation of the basic theory of the study**

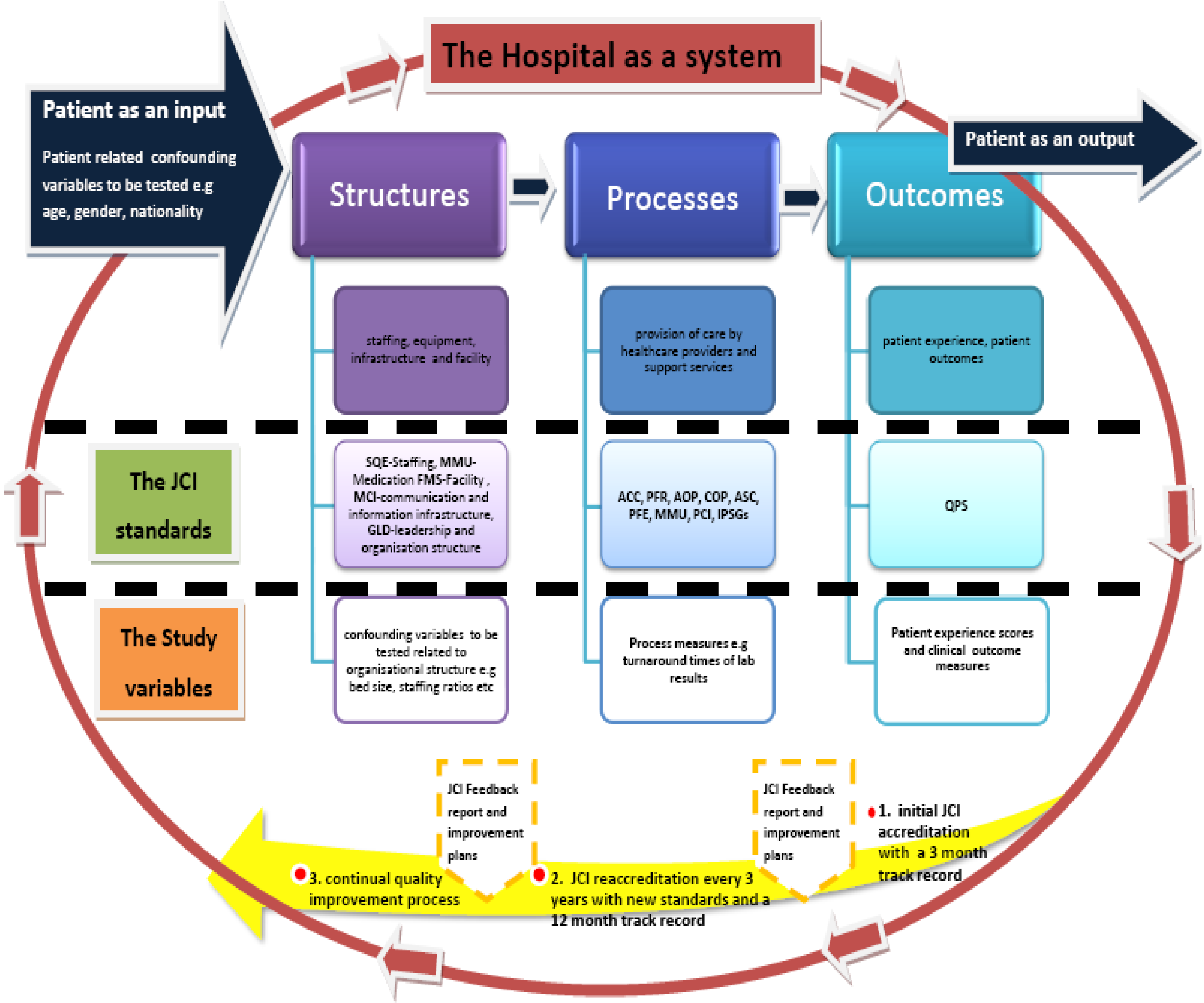
The basic theory has been developed from the literature synthesis. According to Shaw, (2003), several factors make accreditation more difficult to evaluate. Firstly, the endpoints of accreditation are hard to define, and vary with respect to scope, standards and the population evaluated. Secondly, accreditation is not a single technology but a cluster of activities with interventions within various processes and organisational changes. In addition, process-outcome links may be demonstrated for component interventions, and summated as a proxy for overall impact. Finally, case-control studies of institutional accreditation require a large, supportive but uncontaminated universe to sample, compare and monitor over many months; few countries offer this opportunity.

Greenfield and Braithwaite (2007) have described the relationship between quality measures (i.e. outcomes) and accreditation as a complex issue with no apparent direct and clear-cut relationship between them. In view of the above, this researcher is not aware of published literature evaluating the impact of accreditation using time series analysis. In order to capture the impact of accreditation on a predefined set of quality measures over a period of time, a time series analysis of a hospital 1 year before and 3 years after accreditation, will be conducted. The month-by-month comparison of 27 quality measures will evaluate the impact of accreditation on various structures, processes and outcomes of care and used as proxy for overall impact. Based on suggestions from the literature (Babbie, 2004; Bowling, 2002), the study adopted a study design that is quantitative and longitudinal. A time series design will be used to analyse the results and track the effect of implementing the JCI standards on the performance of a 150-bed hospital. The study design will collect data charting change over time, which will be used to evaluate the effect of implementing JCI standards on the organisation's quality measures.

It is the foremost recommendation of researchers that patient opinion should supplement quality measures in healthcare (Avis, 1997; Cleary and McNeil, 1988; Donabedien, 1988). According to Greenfield and Braithwaite (2008), there is limited data on the influence of hospital accreditation on patient satisfaction. The existing studies (Heuer, 2004; Fong. *et al*., 2008) have major limitations, i.e. small sample sizes or not administering validated instruments to assess patient satisfaction. Furthermore, patient satisfaction is an abstract and often ill-defined concept for which there is no uniform measure (Carr-Hill, 1992; Hall and Dorman, 1988; Sitzia and Wood, 1998; Fitzpatrick, 1991; Fitzpatrick 2000; Fitzpatrick and Hopkins, 2000; Edwards and Staniszewska, 2000; Cleary and McNeil, 1988; Cleary, 1999). Generally recognised as multi-dimensional in nature, there is no consensus about exactly which domains should be included or which are most important. Thus, concerns about the problems with patient satisfaction surveys has led to an emphasis on measuring patients' experience rather than satisfaction (Cleary, *et al* 1992; Cleary, 1998). However, the researcher is unacquainted with any evaluation of the impact of accreditation on patient experience. The proposed study attempts to bridge this gap, by conducting a cross-sectional study of the impact of accreditation on patient experience scores of 27 accredited and non-accredited hospitals. To identify factors other than accreditation that impact upon patient experience, surveys will be administered to 391 patients in an accredited hospital. The basic theory is that accreditation improves the quality of care, and this is positively associated with improvement in quality measures and better patient experience scores, having controlled for the effects of other variables.

The conceptual framework (pictured in Figure 1.1) relates to the basic theory of accreditation and its impact on quality of care. Accreditation has developed as a method to strengthen the organisation's ability to provide high and uniform quality services to the patients (Montagu, 2003). Donabedian (2003) proposed to measure the quality of healthcare by observing its structure, its process, and its outcomes. While consumers' evaluation and experience of healthcare proved to be essential outcome measures for the assessment process, the review of literature identified many other indicators related to structure and process. Hospitals are systems that contain structures which support processes that in turn result in outcomes. The JCI standards set demands when it comes to the work processes, but also to structure and performance. In this way the basic accreditation theory is based on the assumption that if structures and processes are compliant with standards, there is an increased probability that the resulting outcomes will be positive for patients receiving care within the hospital system (Knudsen, Christensen and Hansen, 2008). The Joint Commission International Accreditation Standards for Hospitals (JCI, 2011 p. 2) has documented that, 'the underlying philosophy of the standards is based on principles of quality management and continuous quality improvement'. The initial accreditation with the resulting feedback report requires an action plan for improvement. The subsequent re-accreditation survey will evaluate organisations on standards that are revised every 3 years. Standards that are not met require a strategic improvement plan.

Figure 1.1 Theoretical framework of the study



Conceptual Framework of the Accreditation Theory and its impact on patient experience and quality measures.

Source : Author, based on concepts of continual quality improvement and Donabedian's theory of structure, process and outcome

Legend: **SQE**: staff qualifications and education, **MMU**: Medication management and use, **MCI**: Management of communication and information, **FMS**: Facility management and safety, **GLD**: Governance, leadership and direction, **ACC**: Access and continuity of care, **PFR**: patient and family rights, **AOP**: assessment of patients, **COP**: Care of patients, **ASC**: anesthesia and surgical care, **PFE**: Patient and family education, **PCI**: prevention and control of infection, **IPSGs**: international patient safety goals**, QPS**: quality and patient safety

1. The model of continual quality improvement from JCI's accreditation process and feedback system that operates within the hospital as a system.
2. The relationship of JCI standards and their impact on structures (human resources, facility management etc.), processes (provision of care by healthcare

professionals) and outcomes (i.e. the effects of care on a patient's health status measured by patient experience scores and quality measures) as per Donabedian's theory. Structure impacts on outcome mainly through the process of care. Donabedian (2003) concluded that each of the three approaches to quality assessment (structure, process, and outcome), has its advantages and disadvantages. He recommended a combination of all three approaches, 'a precise mix of which it is determined by the nature of the problem to be studied and the availability of the information needed' (p. 56). Donabedian believed that a combination of structure, process and outcome measures allows for a comprehensive evaluation of quality and that an agreement of the results of measurement from the three approaches validates the method and results of assessment. A combination also helps to determine the source of system failure (whether structure, process, or both) in providing quality services, which triggers corrective action and therefore improvement.

3. The relationship of the study variables to the JCI standards and the hospital as a system. The study variables, including confounding variables (that relate to patients and the hospital), their relationship to the JCI standards and the hospital quality measures are illustrated in Figure 1.1. Wagner *et al*. (1999) maintained that, because of the complicated nature of healthcare systems, their measurements must consist of a balance between structure, process, and outcome components.

Originating from the above theory, accreditation standards affect structures, processes and outcomes in a hospital system. If the confounding variables relating to the patient and the hospital characteristics are controlled, then a causal relationship can be tested between accreditation and its impact on quality of care using measures of structures, processes and outcomes.

2 CHAPTER TWO: Research Question, Aims, Hypotheses, Paradigm and Methodology

2.1 Introduction

Several studies have investigated the impact of accreditation on hospital performance including change promotion, professional development, the professions' attitudes to accreditation, organisational impact, financial impact, quality measures, programme reassessment and above all, clinical outcomes (Greenfield and Braithwaite, 2008). However, the outcomes of the accreditation process differ across various geographical and regulatory contexts. To date, no studies have examined accreditation in the UAE and there are insufficient studies in the field of patient experience and accreditation, globally. This thesis aims to contribute to a better understanding of the impact of accreditation in healthcare, including its effect on patient experience and clinical quality. This chapter defines the research question, aims, objectives, research hypotheses and the research paradigm of the thesis.

2.2 Research Question

What is the impact of hospital accreditation on both the clinical quality measures and patient experience?

2.3 Research Aim

To examine the impact of the hospitals' accreditation status on both clinical quality measures and patient experience scores.

2.4 Research objectives

1. The first objective of the study is to identify factors, other than accreditation, that are associated with experience among patients receiving care in Abu Dhabi.

Factors associated with experience are thought to include the structure, process and outcomes of care as well as patient socio-demographic characteristics (Cleary and McNeil, 1988; Minnick *et al*., 1997; Williams, 1994). It is important to investigate the influence of patient characteristics (e.g. age, gender) upon patient experience for two reasons. Firstly, there is a need to control for these factors when testing the significance of the accreditation variable. Secondly, identification of the importance of these factors will enable providers to target patients at risk of negative experiences. Factors to be tested in the multivariate analysis will be patient level variables (age, gender, nationality, education level, length of stay, previous hospital visits, the treatment outcome of the hospital stay) and hospital level variables (hospital size, accreditation status, hospital ownership status (private or government), staffing/patient ratios and patient volume). Patient level variables will be tested in the Al Noor Hospital Patient Experience study (see Chapter Four, Tables 4.2 and 4.3). Hospital level variables will be tested in the 27 hospital cross-sectional study (Table 2.1 below).

2. The second objective of the study is to explore the impact of hospital accreditation on patient experience scores.

Whether accreditation of hospitals truly ensures high quality healthcare is a crucial question that remains to be answered. This highlights the need to provide evidence that accreditation procedures result in improved patient experience. We hypothesise that if accreditation improves quality of care, then this should be positively associated with better patient experience scores, having controlled for the effects of other variables. This objective will be achieved in the 27 hospitals cross-sectional study (see Chapter Five).

Table 2.1 List of independent variables for the 27 hospital cross-sectional study

	Hospital level variables
1	Hospital size (number of beds)
2	Accreditation status (accredited vs. non-accredited)
3	Hospital ownership status (private or government)
4	Staffing to patient ratios (nurse to patient and doctor to patient ratios)
5	Patient volume (number of patients per annum)

3. The third objective of the study is to examine the impact of hospital accreditation on clinical quality as measured by the hospitals performance on clinical quality indicators.

Hospital accreditation is undertaken for the sole purpose of improving quality. It is hypothesised that if the accreditation process is successful in improving the standard of care then this should be positively associated with improved quality as measured by 27 clinical quality indicators. This objective will be achieved in the time series analysis (see Chapter Six).

2.5 Research Hypotheses

2.5.1 Patient experience analysis: Al Noor Hospital case study

H_0: There is no relationship between the socio-demographic characteristics of a patient and their patient experience scores.

H1: There is a positive relationship between the socio-demographic characteristics of a patient and their patient experience scores.

According to Hall *et al*. (1990) patient characteristics have an impact on patient satisfaction. Their investigation concluded that age was the strongest correlate of satisfaction (r = 0.13). Another experiment conducted by Tehrani *et al*. (2011) suggested that elderly patients, who typically have more complicated medical conditions, tended to report higher satisfaction with their care than did younger patients. However, these findings may be subject to respondent bias as it was an internet-based survey and the self-reported data are subject to respondent recall bias and may have affected the survey responses that were received, especially from the elderly group. A randomised survey of 8,428 patients from 39 hospitals (Schoenfelder *et al*., 2011) proved that patients' age, was related to level of satisfaction ($P \leq 0.001$). One possible reason regarding the higher satisfaction rating of older study participants could be that older patients may be treated differently, e.g. more gently than younger patients. Therefore it is hypothesised that older patients will have higher experience scores than younger patients.

Research results are consistent with findings of similar satisfaction scores among men and women (Sack *et al*., 2011; Garcia-Aguilar *et al*., 2000). However, it is hypothesised that women are more demanding of the quality of care, including nursing care. Therefore it is hypothesised that males will record higher experience scores than females.

It is hypothesised that the indigenous population (Emirati) will be more discriminating than the expatriate population. As healthcare is free for the Emirati population in Abu Dhabi and they have the access to travel abroad for healthcare services, they may have higher expectations of care. It is also hypothesised that within the expatriate population patients from developed western economies will have lower experience scores than patients from developing countries.

It is hypothesised that the patients with higher education levels will be more discriminating that those with lower education levels and thus have lower experience scores. Patients with higher education levels may have better access to health information and thus have higher expectations of care.

H_0: There is no relationship between the hospital stay characteristics of the patient and their patient experience scores.

H2: There is a relationship between the hospital stay characteristics of the patient and their patient experience scores.

The length of stay reflects the acuity level of the patient being treated. A long length of stay is typical of patients who need long-term care and have complicated medical conditions. A longer length of stay may provide patients with more opportunities to be dissatisfied. Therefore patients with a longer length of stay will have lower patient experience scores due to the severity and complexity of their condition being treated.

Patients who have a positive treatment outcome will be happier with their care. Therefore, it is hypothesised that patients who have a positive treatment outcome will have higher experience scores than patients who have a negative treatment outcome.

H_0: There is no relationship between the patient survey constructs and the patient’s score for willingness to return, willingness to recommend and overall rating of the hospital.

H3: There is a relationship between the patient survey constructs and the patient’s score of willingness to return, willingness to recommend and overall rating of the hospital.

Studies suggest that nurses are considered to play a key role in direct patient care, and thus interaction with nurses is the main determinant of patient satisfaction (Larrabee *et al*., 2004; Thorsteinsson, 2002). Abramowitz *et al.* (1987) have shown that nursing care is correlated with both patients’ overall satisfaction with their hospital stay and their willingness to recommend the hospital. Therefore it is hypothesised that patients who rate nursing care higher will also have higher ratings of willingness to return, willingness to recommend and overall rating of the hospital.

Studies identify the opportunity for physicians to influence satisfaction ratings by creating rapport with the patient and allowing sufficient time for explanation (Daniel *et. al*, 1999; Gross *et. al*., 1998; Young *et al*., 1998; Sixma *et al*., 1998; Whitworth *et al*., 1999). Therefore, it is hypothesised that patients who rate doctor's care higher will also have higher ratings of willingness to return, willingness to recommend and overall rating of the hospital. The above hypotheses will be tested in the Patient Experience Chapter (see Chapter Four).

2.5.2 Cross-sectional study of accreditation and patient experience scores (27 hospitals)

Ho: The hospital's accreditation status has no impact on the patient experience scores (inpatient and outpatient).

H4: The hospital's accreditation status has a positive impact on the patient experience scores (inpatient and outpatient).

Some researchers point out that accreditation improves a hospital's operations and performance in terms of effectiveness and efficiency (Helbig *et al*., 2006). In addition, accreditation systems focus on the quality of patient care. As a result, it is expected that patient experience will be improved. According to a survey of 73 hospitals (Sack *et al*., 2011), there was no significant difference in the recommendation rate between accredited and non-accredited hospitals. Gender and age were tested in the multivariate analyses. The results may be explained by the substantial variability between the survey hospitals. As emphasised by Greenfield and Braithwaite (2008), there is limited data on the influence of hospital accreditation on patient experience.

H_0: There is no relationship between a hospital's ownership status and their patient experience scores.

H5: Government owned hospitals exhibit lower values in patient experience scores than privately owned hospitals.

Privately owned hospitals within the Emirate of Abu Dhabi are privately funded and receive no government subsidy. This makes private hospitals accountable for their own revenue generation and thus highly competitive. In order to maintain their market share, private hospitals prioritise patient experience. In addition, private hospitals accept all types of health insurance cards whereas the government hospitals only accept the government subsidised insurance cards. Due to these factors, it is hypothesised that private hospitals will have better patient experience scores than government hospitals

Ho: There is a no relationship between the patient volume at a hospital and patient experience scores

H6: Hospitals with lower patient volume will exhibit higher values in patient experience than hospitals with a longer patient volume.

The patient volume of the hospital reflects how busy the hospital is. A high patient volume may result in longer waiting periods, less time with the doctor and overcrowding in the hospital. These conditions will result in lower performance in patient experience due to the negative impact of high patient volumes.

H_0: There is no relationship between the bed size of a hospital and their patient experience scores.

H7: There is an inverse relationship between the bed size of a hospital and their patient experience scores.

It is hypothesised that the larger the bed-size of the hospital the lower the experience level. This is due to the volume impact of services and staffing.

H_0: There is no relationship between the patient/ doctor ratio of a hospital and their patient experience scores.

H8: There is an inverse relationship between the patient/ doctor ratio of a hospital and their patient experience scores.

It is hypothesised that the higher the patient to doctor ratio, the lower the experience score. A large patient to doctor ratio implies a greater time pressure on doctors that may impact on the waiting time and quality of care delivered.

H_0: There is no relationship between the patient/ nurse ratio of a hospital and their patient experience scores.

H9: There is an inverse relationship between the patient/ nurse ratio of a hospital and their patient experience scores.

It is hypothesised that the higher the patient to nurse ratio, the lower the experience score. A large patient to nurse ratio implies a greater time pressure on that may impact on the waiting time and quality of care delivered.

The above hypotheses will be tested in the Cross-sectional Study Chapter (see Chapter Five).

2.5.3 Time series analysis of accreditation of 27 clinical quality measures

Ho: The hospital's accreditation status has no impact on the hospital's clinical quality indicators.

H10: The hospital's accreditation status has a positive impact on the hospital's clinical quality indicators.

The main focus of accreditation is on improving processes, quality of care and compliance with good practice standards. Quality of care can be measured by clinical quality indicators. Thus, if accreditation improves the quality of care, this will be reflected as better performance in the hospital's clinical quality indicators after accreditation has been granted to the hospital. The above hypotheses will be tested in the Time Series Analysis Chapter (see Chapter Six).

2.6 **Research Paradigm**

At a philosophical level, the research paradigm is positivist with the overall methodology being quantitative. The proposed research is intended to be highly structured to achieve the research aims and objectives. The positivist paradigm is appropriate for deducing whether a causal relationship exists between healthcare accreditation and hospital performance in terms of patient experience and clinical quality.

The above hypotheses will be tested through three study components. The first dimension is a multivariate analysis of patient experience, which will be conducted to identify all factors including accreditation that are associated with patient experience. The second dimension is the cross-sectional analysis of 27 hospitals to evaluate the impact of hospital accreditation on patient experience scores. The third dimension is the time series analysis, which will be utilised to test the theory that healthcare accreditation has a positive impact on clinical quality indicators and thus clinical quality.

All dimensions of analysis will use quantitative data. The indicator and survey data collected will be numerical and of both an interval and categorical nature. This research is hypothesis-based with the use of bivariate and multivariate quantitative methods to test the hypotheses.

2.6.1 Component One: Patient Experience Study in Al Noor Hospital

The first study component is an investigation of a large sample of patients in Al Noor Hospital in order to analyse patient experience (see Chapter Four). This study of Al Noor Hospital will use a survey methodology and will be based on a large sample of 391 patients. They will be interviewed regarding their recent hospital experience using a structured questionnaire. This study will examine the effect of patient level variables and hospital stay characteristics on patient experience ratings of construct dimensions which include: doctors, nurses, the discharge process, quality of hospital food, cleanliness, operations and procedures, consistency and coordination of care, treatment with respect and dignity, involvement in decision making, patient rights and feedback, pain management and medication management. The effect of patient level variables, hospital stay characteristics and the construct dimensions on three global ratings (overall rating of the hospital, willingness to return and willingness to recommend) will also be analysed. The analysis will include the additional dependent variables of the composite scores of the three global ratings (the global measure score) and the survey constructs (the aggregated constructs score).

2.6.2 Component Two: Cross-sectional Analysis of 27 Hospitals

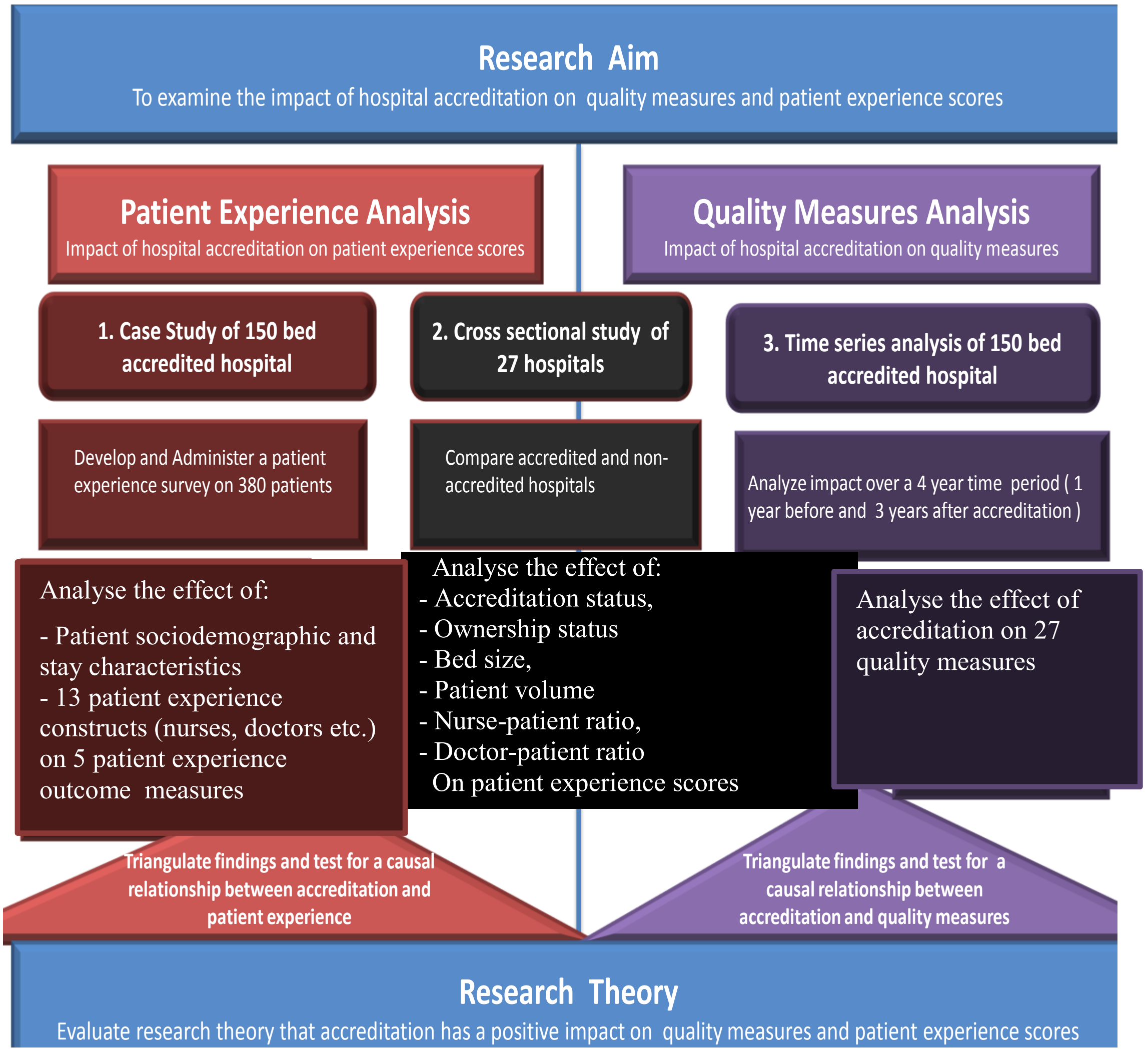
The second study component is a cross-sectional analysis of 27 Abu Dhabi hospitals examining the impact of accreditation on patient experience scores and quality measures (see Chapter Five). This non-experimental cross-sectional study will assess the impact of hospital accreditation on 27 hospitals within Emirate of Abu Dhabi. Retrospective data analysis will be performed on the secondary data of patient experience scores that have been published by the Health-Authority of Abu Dhabi. Firstly, the patient experience data will be derived from the Health Authority-Abu Dhabi Annual Consumer Report. The data in this report are collected by a third party using a modified version of the Hospital Consumer Assessment of Healthcare Providers and Systems (HCAHPS) Survey. Hospitals were requested to provide patient level data for randomly selected dates, during a four-month period. The survey was conducted via CATI (Computer Assisted Telephone Interviews) and face-to-face interviews. The survey commenced at the beginning of 2010 and during this year more than 34,200 patients of hospitals throughout the emirate were interviewed and 23,440 forms were completed and validated.

2.6.3 Component Three: Time Series Analysis of Al Noor Hospital

The third study component is a time series analysis of Al Noor Hospital examining the impact of accreditation on 27 quality indicators (see Figure 2.1). The time series analysis of Al Noor Hospital data will be conducted in order to explore the impact of accreditation, on a predefined set of quality measures, over a period of time (2009 to 2012). Monthly time series analysis commencing 1 year before accreditation and continuing until 3 years after accreditation will be conducted. The month-by-month comparison of 27 quality measures will evaluate the impact of accreditation on various structures, processes and outcomes of care used as proxies for the overall impact (see Chapter Six).

The results of the three study components noted above will be triangulated in order to achieve the research objectives (Figure 2.1). Methodological triangulation will enable more than one method utilised to gather data, such as interviews, cross-sectional secondary data and time series data. Triangulation will facilitate the validation of the results of the study outcomes through cross verification from the three studies which use a combination of research methodologies to examine of the same phenomenon of accreditation. Details of the study methodologies and data collected will be described in the succeeding section.

Figure 2.1 Components of the research programme



The proceeding section provides an overview of the research methodology used to address the research question and related hypotheses.

2.7 Research Methodology

2.7.1 Introduction

The preceding section has addressed the literature regarding hospital accreditation and its impact on various measures. A research gap has been identified concerning the evaluation of accreditation on hospital outcomes in the Middle Eastern context. In addition, there are only a few studies on the impact of hospital accreditation on patient experience. This section defines the proposed research methodology necessary for addressing the stated research question, aim and objectives, drawing on literature examples and proven practices in the research field.

According to Øvretveit and Gustafson (2002), large-scale quality programmes are difficult to evaluate using experimental methods. Quality programmes usually cannot be controlled or standardised – many of these interventions are multi-component and change over time. The programme of research such as that proposed is required in order to provide research evidence regarding the relationship between accreditation and clinical indicator performance, and between accreditation and patient experience. Thus, the research objectives require the use of a multi-level approach incorporating multi-layered data (Braithwaite *et al*., 2004). In conducting the research programme, a wide range of analytical techniques need to be applied including objective measurements of quality such as clinical indicators and perceptions of quality in terms of patient experience. The strength of this design is that it allows triangulation of results.

2.7.2 Sample Design and details of the data collection process

The sample design, data collection process and analysis will be described in detail within each chapter relevant to the study components. The next chapter will detail the pilot study analysis of the patient experience questionnaire.

3 CHAPTER THREE: The Pilot Study for the Patient Experience Case Study at Al Noor Hospital

3.1 Introduction

The proposed research on the impact of accreditation is multi-method in nature. The first dimension of the thesis is a case study of the determinants of patient experience within a 150-bed hospital using a validated patient experience survey. This dimension of the study requires a pilot study. The primary objective of the pilot study was to refine and prospectively validate an Inpatient experience questionnaire that will be used in the main study. The secondary objective was to test and review the process of questionnaire administration. The final objective was to develop and define the research process and data analysis methods of the survey for the main study.

The second dimension is a cross-sectional study of the impact of accreditation using patient experience scores of 27 hospitals within the Abu Dhabi Emirate. Since secondary data will be used, a pilot study is not necessary.

The third dimension of the thesis is a time series analysis of the impact of accreditation over a four-year period (before and after accreditation) of a 150-bed hospital (Al Noor Hospital) in Abu Dhabi. The data used in this study are collected by the organisation for the purposes of accreditation according to set standards and, thus, a pilot study is not relevant.

Therefore, this chapter describes the pilot study of the patient experience survey that was used for the case study analysis of patient experience in the 150-bed hospital.

3.2 Questionnaire Development

In order to develop a validated survey instrument, all questionnaires used in the national (e.g. US, UK etc.) regulators' national surveys of patient experience internationally were reviewed. Bibliographic databases were also used to identify questionnaires and tools that have explored patient experience within the hospital setting. In addition to jurisdictional surveys, the author examined two international examples of surveys of hospital patients that could provide suitable templates for a minimum dataset for the patient experience survey: the UK National Health Service (NHS) Picker survey (for admitted patients) and the US based HCAPHS. The main advantage of adapting one of these approaches is that they are supported by significant investment and rigorous attention to methods. A secondary advantage is the potential for international comparison. Thirdly, a modified HCAPHS survey was also used for assessment of patient experience by the Health Authority- Abu Dhabi, thus the possibility of comparison at an Emirate level exists.

Another objective of this project was to identify data items in these surveys that could be used to report on an indicator of hospital quality. Thus items and constructs were selected based on their relevance to quality, Joint Commission International Standards and patient and family rights.

Comparative information will be more useful if there is the potential to explore specific dimensions of care. These address the following aspects of patient experiences.

1. **Admission processes** — Waiting to be taken to a room/ward/bed. The issue is not actual waiting times but the patient's perception of how problematic it was.
2. **Information/Communication** - Focusing on patient assessments of the adequacy of information provided about the condition or treatment, and the extent to which patients believed they had opportunities to ask questions.
3. **Involvement in decision-making** - Focusing on patient assessments of the adequacy of their involvement in decision-making.
4. **Treated with respect -** Patients' views on whether hospital staff treated them with courtesy, respect, politeness and/or consideration. These questions were asked separately for both doctors and nurses. Patient assessments of the extent to which cultural and religious needs were respected could also be included.
5. **Privacy** - Patient assessments on the extent to which their privacy was respected.
6. **Responsiveness of staff** - The survey included a patient experience question related to how long nurses took to respond to a call button. Related questions concerning availability of healthcare staff were included.

7. **Management of pain-** patient assessment of how well their pain was managed.
8. **Information provided related to medication management**
9. **Physical environment** - Patient assessments of cleanliness of rooms and toilets/bathrooms, quietness/restfulness, and quality of food.
10. **Patient rights and feedback** - Patient assessments of how complaints were handled and whether they were informed of their rights.
11. **Discharge** - Information provided at discharge on to how to manage the patient's condition.

The questionnaire contained 60 items. All experience-related statements used a five point Likert scale ranging from 'always' (5) to 'never' (1). A 'does not apply' column was included for all relevant sections. It is noted that 4-point Likert scales tend to distort the answers, as there is no neutral mid-point. This can lead to survey bias as respondents are forced to select a side. Therefore, answers tend to be skewed to one side, which is avoided if a 5-point Likert scale is used. A 5-point scale gives respondents more scope to contemplate on which side to respond. Questions related to patient rights and feedback were 'yes', 'no', and 'does not apply'. Demographic questions were included towards the end of the survey. The question for the overall rating of the hospital used a scale from one to ten. However, patients 'overall satisfaction' rating is often used as a 'headline' indicator of the hospital's performance .The assumption made in this analysis is that, having completed several dozen 'experience' questions in the questionnaire, patients' answers to the satisfaction question will have been influenced by thinking about all those aspects of care. Thus, each experience response will be correlated with the three overall ratings (overall hospital rating, willingness to return and willingness to recommend) to determine which experience indicators have the strongest relationship to the satisfaction expressed by patients. The purpose here is to use a robust and logical method of analysis to provide conclusions. The second last question asked participants to rank the importance of the questionnaire constructs from one to ten. The final question was open ended to allow for additional comments from the participants. Table 2.1 below illustrates the survey dimensions and their original sources.

Table 3.1 Survey dimensions and their original sources

DIMENSION	ORIGINAL SOURCES
1. YOUR CARE FROM NURSES	
1. Did the nurses treat you with courtesy and respect?	**HCAPHS**
2. Did the nurses listen carefully to you?	**HCAPHS**
3. Did the nurses explain things in a way you could understand?	**HCAPHS**
4. Were there sufficient nurses on duty to care for you in hospital?	**PICKER**
5. Did the nursing staff respond immediately to your call bell?	**HCAPHS and PICKER**
6. Did you have confidence and trust in the nurses treating you?	**PICKER**
7. Did the nurses talk in front of you as if you weren't there?	**PICKER**
2. YOUR CARE FROM DOCTORS	
1. Did the doctors treat you with courtesy and respect?	**HCAPHS**
2. Did the doctors listen carefully to you?	**HCAPHS**
3. Did the doctors explain things in a way you could understand?	**HCAPHS**
4. Did you have confidence and trust in the doctors treating you?	**PICKER**
5. Did the doctors talk in front of you as if you weren't there?	**PICKER**
3. OPERATIONS AND PROCEDURES	**PICKER**
4. CLEANLINESS	**HCAPHS**
5. CONSISTENCY AND COORDINATION OF CARE	**PICKER**
6. TREATMENT WITH RESPECT AND DIGNITY	**PICKER**
7. INVOLVEMENT	**PICKER**
8. PATIENT RIGHTS AND FEEDBACK	**PICKER AND OWN ADAPTATION**
9. PAIN MANAGEMENT IN THIS HOSPITAL	**PICKER**
10. MEDICATION MANAGEMENT IN THIS HOSPITAL	**HCAPHS and PICKER**
11. WHEN YOU LEFT THE HOSPITAL	**HCAPHS and PICKER**
12. WAITING FOR ADMISSION	**PICKER**
13. QUALITY OF HOSPITAL FOOD	**HCAPHS**

3.3 **Report of the Pilot Study**

3.1.2 Introduction

A pilot test was conducted to evaluate the questionnaire design. A pilot study is defined as a small-scale version of the proposed research. It is used to develop and refine the research process, often including the data collection survey (Burns and Grove, 2001; Polit and Beck, 2010). The pilot study is conducted with people whose characteristics are similar to those of the proposed sample population (Neiswiadomy, 2002). The purpose of this pilot study was to determine the reliability of the questionnaire. Face-to-face interviews of patients, visiting the hospital within a one week period, were conducted by a team of surveyors and the researcher. A predefined close-ended questionnaire was used. The complete questionnaire, including the demographic variables, was piloted. The interviewers were appropriately trained and supervised by the researcher to complete the questionnaire during the interview and to note the amount of time it took to fill out the questionnaire. The pilot study provided the researcher with an opportunity to talk with some of the patients, who completed the questionnaire, in order to gather their perceptions of the items and the overall questionnaire.

3.1.3 Objectives of the Pilot Study

The purpose of piloting the questionnaire was to review how it performed in practice. Piloting is a crucial stage in the development of a questionnaire and is undertaken to ensure that all the relevant issues are included, the order is correct and ambiguous or leading questions are identified (Wilson *et al*., 2000). Based upon the literature review and adaptation to this specific research dimension, the following objectives were defined for the pilot study:

1. Develop a valid, reliable and usable questionnaire to evaluate patient experience,
2. For each question of the face- to- face survey was the relevant information easily captured?

- Were all the words understood?
- Were the questions interpreted the same way by all respondents?
- Did all close-ended questions have an answer that applies to each respondent?
- Did the survey have a user-friendly format that encouraged participants to respond?
- Were the questions answered correctly and in a way that can be understood?

- Did any part of the survey suggest bias on part of the researcher? (Salant and Dillman, 1994)?
- Were the instructions clear?
- Was the order of the questions appropriate?
- Were the objectives of the survey clearly understood by both the surveyor and the respondents (Bourque and Fielder, 1995)?

3. Reduce the number of questions to a minimum through evaluation in the pilot study;
4. Administer the questionnaire to a sample of patients to test validity and reliability ;

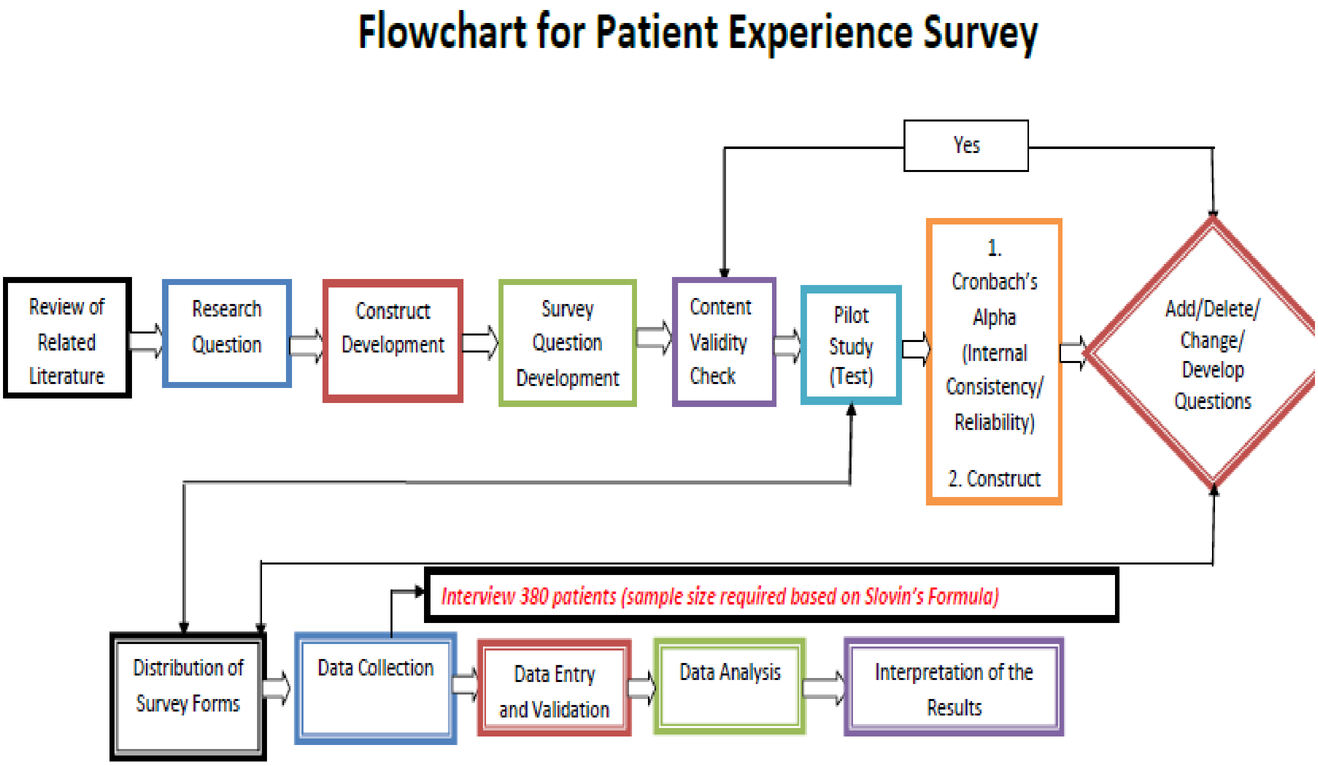
- Were the survey constructs internally consistent, as measured by Cronbach's Alpha?
- Were the survey items correlated with the scale items?

5. Test the feasibility of administering the questionnaire by analysing both the distribution and the return of completed questionnaires;
6. Test the acceptability to patients of the questions and response formats through analysis of response patterns.

3.1.4 Pilot study methodology

The methodology of the pilot study for the patient experience component of the study is identical to the main study. The questionnaire to be used in the main study, the sample and process of administration were piloted to assess whether the methodology and the survey instrument were sufficient to produce reliable and valid data. See Figure 3.1 below. Figure 3.2 describes the COMPASS method for survey development that was developed by the author for this study.

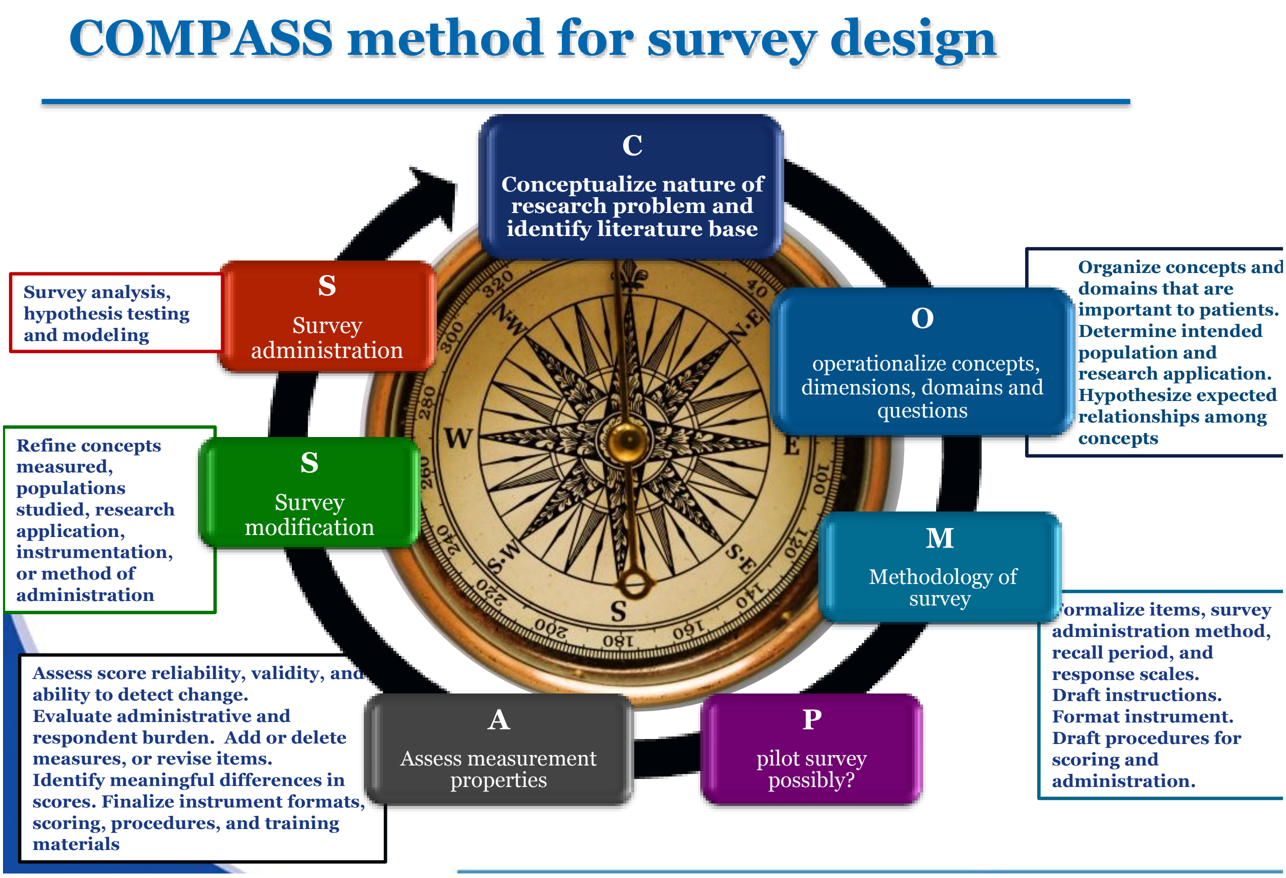
Figure 3.1 Flowchart of the process for survey development



The figure shows the Method for Patient Experience Survey. In order to develop the survey, the author Reviewed Related Literature (RRL) for this study. Research questions were developed and checked the validity of the content using pilot study. A pilot test (N=36) was conducted in order to establish content validity. Cronbach's Alpha was used to test the data from the pilot test in determining the construct validity (Internal Consistency/Reliability).

The pilot test was found to be an important stage of the instrument development process as necessary revisions were identified. These revisions were made and the final survey questionnaire will be used to evaluate the result of Patient Experience Survey.

Figure 3.2 COMPASS method for survey design



Author: Subashnie Devkaran, Corporate Director-Quality and Patient Safety, Al Noor Hospital

3.1.5 Selection of the Pilot Study Sample

A pilot study was conducted with a sub-sample of 50 patients. Following specific recommendations in the literature (Salant and Dillman, 1994; Bourque and Fielder, 1995; Czaja and Blair, 2005) a purposive sample, rather than a random sample of the population was chosen: 'It is important that the diversity of the population be represented among those who pre-test the questionnaire, especially with respect to characteristics that are expected to affect the way people answer' (Salant and Dillman, 1994). The face-to-face survey was carried out on a sample of 50 patients who were about to be discharged from the 150–bed accredited acute care hospital in Abu Dhabi. The hospital selected for the pilot study is Al Noor Hospital and thus the same hospital as that in the main study.

In order to identify the full range of issues that were important to patients, to cover the entire journey of care (from admission to discharge), and to minimise bias from these causes, there were no clinical limitations applied to the patient selection. Patients were recruited from all wards and units within the hospital during a one week period. Eligible subjects were thus all inpatients who stayed at least 24 hours in the hospital and were to be discharged on the day of the survey. This method of selection was to avoid recall bias and patients were asked to rate their current hospital stay, as assessment of the quality of care might change over time (Aharony and Strasser, 1993). No exclusion criteria were applied as the sample needed to reflect the diversity of the patient population.

3.1.6 Application of the Pilot Study

3.1.6.1 Survey Administration

The survey administration method adopted was that of a face-to-face survey interview. All participants were patients who were given discharge orders during the survey period. A cover page was included in the survey, requesting their consent, guaranteeing patients of confidentiality, explaining the subject of the survey and providing encouragement to complete it. Patients who refused to participate were not interviewed. After the return of the completed survey, interviews with a number of respondents were held regarding the technical aspects as well as the subject matter of the questionnaires. Through the completed surveys themselves, as well as the interviews conducted by the researcher with the surveyors and patients, suggestions for certain changes in the clarity of the questions and confirmation regarding specific aspects of the approach were developed.

3.1.6.2 Response Rate and patterns

A total of 36 questionnaires were completed, resulting in a response rate of 72%. Patients refused because they were in pain or had visitors. The distribution of responses for each question was examined in the questionnaire in order to identify potentially non-discriminatory, confusing, or unnecessary questions. Questions for which responses showed little variation across patients (i.e. did not discriminate between different patient experiences) and all questions with missing responses were examined. No specific patterns could be detected in the omitted questions.

3.1.6.3 Further Communication

To facilitate further communication between the researcher and the respondents, patients were given the option to provide contact information for a follow-up telephonic interview. This provided the researcher the opportunity to clarify any responses that were not consistent with the rest of the study population. In addition to the survey questions, patients were asked the following questions about the survey instrument:

- Were the questions easy to understand?
- Approximately how long did it take you to complete the questionnaire? Did you regard this as too long?
- Did you require information or assistance from others completing the questionnaire?
- Did you have any concerns about providing information regarding specific questions or the subject as a whole?
- Were there any important issues, from your perspective, that were not included in the questionnaire?
- Do you have any general comments regarding the questionnaire?
- Would you be available for clarification via telephone interview?

3.1.7 Qualitative analysis of the Pilot Study

The analysis of the patient responses are described below:

1. Did the question collect the intended information?

The statistical analysis of the gathered data provides evidence of the usability of the data to the intended application. No misaligned responses were detected and no changes to the questions in this regard were deemed necessary.

2. Was the wording of the questionnaire clearly understood by the respondents?

No issues were raised concerning the understanding of the questions.

3. Were the questions uniformly interpreted by all respondents?

By briefly reviewing the questions and responses in the follow-up interviews, no deviations in the interpretation of the questions were detected nor did the returned questionnaires show any obvious anomalies in this regard.

4. Do all close-ended questions have an answer that applies to each respondent?

Here a need to adjust the questionnaire was found in two of the multiple-choice questions. In both cases the optional responses had to be amended to include answers applicable to certain respondents, which had been missed in the design of the questionnaire. The amendments are documented in the section regarding below the changes to the questionnaire resulting from the pilot study.

5. Was the questionnaire formatted clearly to provide a positive impression that motivates people to respond?

The high response rate, as well as comments during the interviews, showed a high motivation of recipients to respond to the questionnaire.

6. Were the questions answered correctly and in a way that can be understood?

Most of the questions featured a number of optional answers for selecting the appropriate choice. Understanding and interpreting of the responses by the researcher in these cases did not turn out to be problematic. Open ended questions and request for additional comments did provide further information and did not impair understanding.

7. Does any part of the questionnaire suggest bias on part of the researcher?

Neither in the questionnaire responses nor in the follow-up interviews were any concerns voiced regarding bias by the researcher. In addition, the individuals administering the questionnaire did not provide care to the patients thus making data collection more objective.

8. Were the instructions clear?

Neither in the responses nor in the follow-up interviews were any issues or complaints voiced regarding the questionnaire instructions. Quality and completeness of the questionnaire responses indicated a good understanding of the instructions.

9. Was the order of the questions appropriate?

As the questionnaire was lengthy, the orders of the questions were reformatted in order to improve the flow of the interview.

10. Are the objectives of the survey clearly understood by both the surveyor and the respondents?

The objectives of the study were stated succinctly in the cover page of every survey. In addition, interviewers briefed the respondents prior to commencing the interview. Neither in the written responses nor during the interviews was any confusion detected about these stated goals. On the contrary, the patients were keen to participate in the survey.

3.1.8 Validation of the survey instrument

3.1.8.1 Face Validity and Content Validity: Questionnaire Pretest

Survey validity refers to the degree that an instrument actually measures what it is designed to measure. Face and content validity are qualitative measures of validity and secured using a panel of experts who judge the surveys appearance, relevance and representativeness of the items. Face and content validity are important first steps to establishing construct validity because they establish the accuracy and connection among the items and variables measured (Burton and Mazerolle, 2011). A pre-test procedure was carried out to begin face and content validation of the questionnaire. First, five hospital employees (panel of experts) who had a recent hospital experience as patients reviewed the items for understandability and clarity of the questions, and consistency in the terminology used in the questions and in healthcare settings. After several iterations, the questions were judged to be unambiguous and comprehensible. The terminology used in the questions was deemed to be the same as the terminology that was easily understandable by patients.

The hospital employees were asked to fill out the questionnaire and to comment on its appearance and content. The comments were reviewed and the instrument was revised based on their feedback. An Arabic -speaking doctor then translated the final draft into Arabic. Four Arabic/ English-speaking staff members from a variety of backgrounds subsequently reviewed the Arabic translation. After being evaluated and being revised as a result of the above comments, the questionnaire was deemed ready for pilot testing.

3.1.8.2 Construct validity

Instrument development begins with the first step as defining the constructs and determining the domain content. Step two involves generating the items in the survey and judging the appropriateness of the items. Step three involves pilot testing the scale and thus finalizing the scale (Burton and Mazerolle, 2011).

Adaptation of the Picker Questionnaire

Step one of construct validity begins with a thorough exploration of the relevant literature. Concerning construct validity, Sitzia (1999) was disappointed to find that 80% of the quantitative studies on patient experience did not refer to previous literature as a strategy. The results also revealed that studies that used their own new instruments (80%) used less valid and reliable measurements than the studies that used old instruments (Sitzia, 1999). His analysis showed that 60% of the studies using a new instrument did not undergo reliability or validity, tests which he considered 'unacceptable research practice' (Sitzia, 1999, p. 325). Item generation requires a strong understanding of the existing literature and the existing scales (Burton and Mazerolle, 2011). Thus, after extensive review of the literature, the researcher chose to adapt the survey tool from the Picker Questionnaire due to extensive efforts made to ensure its validity, reliability, adaptability and use internationally. In brief, the development of the Picker instrument involved consultation with experts, systematic literature review and organisation of patient focus groups, and in-depth interviews with patients from different countries to determine issues of salience to them in healthcare encounters. In addition, the questionnaire was piloted extensively before the final versions were produced (Cleary *et al*., 1991, Jenkinson *et al.*, 2002). The HCAPHS survey was reviewed and found to be limited as it did not cover the following core domains: operations and procedures; consistency and coordination of care; treatment with respect and dignity; involvement; patient rights and feedback and quality of food. These core domains had the highest correlation to the overall rating (Cleary *et al*., 1991, Jenkinson *et al.*, 2002) and, therefore, included in the survey. A basic set of questions relevant to the study hospital and applicable to the patients was selected. In order to maintain the validity of the survey tool, attempts were made to retain all the applicable items within each domain. Appropriate HCAPHS questions, that were complimentary to the domains within the Picker survey, were included. Regardless of the type of questions/items used, the author attempted to ensure: a logical sequencing of questions based on the patient's journey of care; use of neutral language (non-leading); and asking only one question at a time per item. Once this was completed, the survey was evaluated for face and content validity described above.

3.1.8.3 Data transformation

Each item was scored one to five on a Likert Scale, with high scores indicating a greater level of satisfactory experience rating. Missing data and answers in the 'does not apply' category were coded as zero. Dichotomous variables were coded as one for 'yes' and zero for 'no'. The overall rating was coded from one to ten, with higher scores relating to higher ratings.

3.1.8.4 Analysis, reliability and validity

After pilot testing the survey, the researcher analysed the individual survey items to ensure unidimensionality. Unidimensionality means that a single item helps to explain only one construct, not multiple constructs. This is assessed using inter-item correlation matrices. Items were discarded if they had more than 20 percent of the data as missing or 'does not apply'. Frequency tables and descriptive statistics were produced in order to detect any patterns in the missing data or deviations in the interpretation of the questions. Inter-item correlation matrices were computed to check that each item was unidimensional and highly correlated with the corresponding scale score.

Saraph, Benson, and Schroeder (1989, as cited in Counte and Meurer, 2001) confirmed the need for assessment of continuous quality improvement implementation to be reliable and valid. They argued that Cronbach's alpha is the best method for reliability testing because it requires only one administration and is the most general form of reliability tests. Sitizia (1999) supported this in his analysis of published studies. His findings revealed that the internal consistency approach was the most frequently used test for reliability.

Internal consistency of the scales was assessed using Cronbach's alpha coefficient (Crocker and Algina, 1986). This analysis normally produces a figure between 0 and 1, where higher values indicate a higher degree of internal consistency within the question set. A coefficient greater than 0.7 is considered satisfactory (Nunally and Berstein, 1994). Items with Cronbach's alpha of 0.7 and above were retained in most constructs.

Items that reduced the size of Cronbach's alpha were removed. External construct validity was checked by reviewing if the patient experience score differed with respect to the open-ended comments and response to the overall satisfaction item (Weiss and Senf, 1990).

3.1.8.5 Results of the analysis and modifications made to the questionnaire

1. The construct 'Your care from nurses' had a Cronbach's alpha of 0.65. The removal of the item 'Did the nurses talk in front of you as if you weren't there?' resulted in a higher reliability with the alpha =0.85 and it had a negative inter-item correlation. The decision was made to retain this item in the survey, as it would augment the researcher's understanding of the conduct of the nurses (see Appendix 3A).
2. The construct 'Your care from doctors' had a Cronbach's alpha of 0.37. Since removal of the item 'Did the doctors talk in front of you as if you weren't there?' resulted in a marginally higher reliability with the alpha =0.54 and it had a low inter-item correlation. The decision was made to retain this item in the survey, as it would augment the researcher's understanding of the conduct of the doctors.
3. Since all the items in the construct 'Operations and Procedures' resulted in a high reliability with the alpha =0.95, the decision was made to retain all the items. An example of the analysis of Cronbach's Alpha is described in Table 2.2 below.
4. The construct 'Cleanliness' had a Cronbach's alpha of 0.68. Since removal of the item 'Were the toilets and bathroom that you used kept clean while in hospital?' resulted in a higher reliability with the alpha =0.71. This item was removed from the survey. In addition, the item 'Was the hospital room or ward kept clean?' was able to capture this dimension of cleanliness.
5. As the construct on 'consistency and coordination of care' consisted of only two items, the alpha was low. However, this construct is of relevance to the study and also a chapter in the JCI standards, thus it was retained in the survey.

Table 3.2 Analysis of Cronbach's alpha for the survey construct of 'operations and procedures'.

Overall Cronbach's Alpha	Cronbach's Alpha Based on Standardised Items	N of Items
0.95	0.95	4

Item	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Squared Multiple Correlation	Cronbach's Alpha if Item Deleted
1. Did the doctor explain the risks and benefits of the operation or procedure in a way you could understand?	7.58	45.85	0.82	0.75	0.95
2. Did the doctor explain beforehand what would be done during the operation or procedure?	7.97	43.86	0.93	0.95	0.91
3. Did the doctor answer questions about the operation/procedure in a way you could understand?	7.83	43.46	0.92	0.94	0.92
4. Did the anaesthetist explain how he/she would put you to sleep or control your pain?	7.78	46.24	0.82	0.71	0.95

6. Since inclusion of all the items for the construct 'treatment with respect and dignity' resulted in a high reliability with the alpha =0.85, all the items were retained.
7. Because inclusion of all the items for the construct 'Involvement in care and decision-making' resulted in a high reliability with the alpha =0.89, the decision was made to retain all the items for this construct.
8. The overall alpha was low for 'patient rights and feedback', and deletion of the item 'Did you have a reason to make a formal complaint while at the hospital?' resulted in a marginally higher alpha of 0.47, the decision was made to remove this item from the survey. This question was also an area where patients reported confusion as it was perceived as a leading question. The question was therefore changed to 'did you actually make a formal complaint while at the hospital?'
9. The inclusion of all the items for the 'management of pain' construct resulted in a high reliability with the alpha =0.75, so all the items were retained.

10. Even though the ‘medication management’ construct consisted of only two items, inclusion of all the items resulted in a high reliability with the alpha =0.70. Thus the all the items for this construct were retained.
11. The ‘waiting for admission’ construct, which consists of two items, resulted in an overall alpha of 0.50. However, the admission process is important in the patient’s journey and this construct was retained.
12. Since the ‘quality of hospital food’ construct items yielded an alpha =0.89, all the items were retained.

The impact on validity of combining questions from two questionnaires (Picker and HCAPHS) was marginal. Items were removed from the survey either because they were not applicable to a large proportion of the respondents, or because their removal resulted in the increased reliability of the instrument. Only four out of the 13 constructs had a Cronbach’s alpha of less than 0.7. The lower reliability is explained by the constructs containing only two items. Therefore each item may constitute a description of a different situation. For example, the patient rights and feedback construct evaluated both complaints and patient feedback. However, given the purposes of the questionnaire, these two items are thought to represent one of the most salient issues in the patients’ experience of hospital care. Furthermore, the constructs with low reliability were retained because they also had high face validity as an important aspect of patient care.

In addition to statistical analysis, the pilot study also revealed various challenges with administering the survey. Firstly, patients felt that the survey was lengthy. Thus the author reduced the survey length. The patients’ demographic data is captured in the medical record so these details were pre-populated and confirmed with the patient in order to reduce the time taken. Secondly, only inpatients were surveyed and in order to evaluate the complete patient journey only patients who were close to discharge were included. On average surveys took 20 minutes for completion. Patients found it difficult to rank the 10 constructs. Thus, following the pilot study analysis, additional assistance will be provided to patients, by the surveyors, in answering this question in the main study. No concerns were expressed regarding the clarity of the questions.

Furthermore, in order to correlate the overall experience scores with the overall rating of the encounter, two additional questions were added on a ten point scale as follows:

‘Would you return to the hospital for treatment?’ and ‘Would you recommend this hospital to your family and friends?’. An additional item was added to the demographic section to evaluate the outcome of the hospital stay on a five point Likert scale as follows ‘How much did the hospital treatment/ operation improve your health problem?’. This question will inform the researcher of the treatment outcome enabling further analysis of the correlation of the treatment outcome with the patient experience scores.

There were concerns about obtaining unbiased replies from patients, who may be reluctant to criticise the staff that had cared for them. To maintain objectivity, the surveyors administering the questionnaire did not provide patient care and reported to the Quality Department. Both the cover page and surveyors emphasised to patients the value of both positive and negative feedback in reviewing services.

Interviewees favoured the paper questionnaire as they felt that the questionnaire was simple, user-friendly, and suitable for different patient groups (e.g. elderly, non-English speakers). In addition, the questionnaire was administered face-to-face so that any concerns were clarified by the surveyor.

3.1.8.6 Results of the pilot patient experience survey data

In brief, a majority of patients rated the following constructs highly: Nurses, doctors, operations and procedures, cleanliness, consistency and coordination of care, treatment with respect and dignity, involvement, patient rights and feedback, pain management, medication management, the discharge process and the admission process (see Table 2.3). This was consistent with the overall rating of the hospital, which was 8.5 out of 10. The demographics of the sample population were also consistent with the hospital demographic data, with 74% of patients rating their health as excellent (Appendix 3B), 22% of patients having an undergraduate degree (Appendix 3C) and 53.3% of the sample population being Emirati (Appendix 3D). A majority of patients (32%) were in the 35-49 year age group (Appendix 3E), most patients (73%) were married (Appendix 3F), stayed for 2-4 nights (43%) (Appendix 3G), and had 2-4 hospital visits (37%) (Appendix 3H). The male-female patient ratio was 40:60 (Appendix 3I).

Table 3.3 Patients' ranking of importance of the survey constructs

Ranking of Importance	Mean	Rank
Your Care From The Doctors	2.38	1
Treatment with Respect and Dignity	2.50	2
Your Care From The Nurses	3.21	3
Cleanliness of the Hospital and Hand-Washing	3.42	4
Your Pain Management in this Hospital	5.06	5
Patient Rights and Feedback	5.17	6
Your Medication Management in this Hospital	5.79	7
Consistency and Coordination Of Care	6.47	8
Involvement in Decision Making	6.79	9
Management of Your Operations and Procedures	8.08	10

The above ranking is consistent with the literature on patient experience specifically the core domains of the Inpatient Picker questionnaire (Jenkinson *et al.*, 2002, Cleary *et al.*, 1997). In addition, the rankings are also consistent with the results of the scale items and the patient comments.

3.1.9 Conclusion

The patient experience questionnaire has been developed through a detailed and systematic process. Based on the above pilot study and analysis of the results, the researcher has assessed the survey instrument as meeting the above objectives and as having acceptable validity and reliability. The survey, thus, can be used successfully in the study hospital for the purposes of assessing patient experience in the main study (see Chapter Four).

The next chapter outlines the case study analysis of patient experience (using the above survey tool) at Al Noor Hospital.

3.2 Appendix

Appendix 3A. Results of survey reliability

Areas considered for the study	Indicators	Scale	Cronbach's Alpha Value
A. Your care from nurses	1.Did the nurses treat you with courtesy and respect?	**5-point likert scale**	0.649
	2. Did the nurses listen carefully to you?		
	3. Did the nurses explain things in a way you could understand?		
	4. Were there sufficient nurses on duty to care for you in hospital?		
	5. Did the nursing staff respond immediately to your call bell?		
	6. Did you have confidence and trust in the nurses treating you?		
	7. Did the nurses talk in front of you as if you weren't there?		
B. Your care from doctors	1. Did the doctors treat you with courtesy and respect?	**5-point likert scale**	0.374
	2. Did the doctors listen carefully to you?		
	3. Did the doctors explain things in a way you could understand?		
	4. Did the doctors talk in front of you as if you weren't there?		
	5. Did you have confidence and trust in the doctors treating you?		
C. Operations and procedures	1. Did the doctor explain the risks and benefits of the operation or procedure in a way you could understand?	**5-point likert scale**	0.947
	2. Did the doctor explain beforehand what would be done during the operation or procedure?		
	3. Did the doctor answer questions about the operation/procedure in a way you could understand?		
	4. Did the anesthetist explain how he/she would put you to sleep or control your pain?		
D. Cleanliness	1. Was the hospital room or ward kept clean?	**5-point likert scale**	0.679
	2. Were the toilets and bathroom that you used kept clean while in hospital?		
	3. Did the doctors wash or clean their hands before touching you?		
	4. Did the nurses wash or clean their hands before touching you?		
E. Consistency and coordination of care	1. Did the doctors/nurses say different things? Sometimes in a hospital, doctors /nurses will say one thing and another will say something quite different. Did this happen to you?	**5-point likert scale**	0.319
	2. Did the doctors and nurses work well together?		
F. Treatment with respect and dignity	1. Overall, did you feel you were treated with respect and dignity while you were in the hospital?	**5-point likert scale**	0.845
	2. Did discussions about your condition or treatment occur in private?		
	3. Were you given privacy while being examined or treated?		

G. Involvement	1. Did you receive sufficient amount of information about your condition and treatment?	**5-point likert scale**	0.89
	2. Did staff involve you in decisions about your care and treatment?		
	3. Were staff willing to listen to your healthcare problems?		
H. Patient rights and feedback	1. Did you have a reason to make a formal complaint while at the hospital?	**2-point likert scale (yes or no)**	0.419
	2. Did you actually make a formal complaint while at the hospital?		
	3. Did the hospital staff encourage your feedback?		
	4. Were you made aware of your patient rights at the hospital?		
I. Pain management in the hospital	1. Did your doctors explain the amount of pain to expect?	**5-point likert scale**	0.751
	2. Did your nurses explain the amount of pain to expect?		
	3. Was your pain well controlled?		
J. Medication management in this hospital	1. Were the purposes of all medications sufficiently explained to you?	**5-point likert scale**	0.703
	2. Were the possible side effects of medicine explained to you?		
When you left the hospital	1. Did you receive written information about how to manage your condition and recovery at home?	**5-point likert scale**	
Waiting for admission	1. Was the admission staff helpful?	**5-point likert scale**	0.503
	2. On admission, were you provided with sufficient information about your stay?		
	3. How long did you wait for a bed after you arrived at the hospital?		
Food	1. Were you satisfied with the quality of the hospital food?	**5-point likert scale**	0.889
	2. Were you satisfied with the temperature of the hospital food?		

Appendix 3B. Overall Health Rate

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Poor	1	2.8	2.9	2.9
	Fair	1	2.8	2.9	5.7
	Good	7	19.4	20.0	25.7
	Excellent	26	72.2	74.3	100.0
	Total	35	97.2	100.0	
Missing	System	1	2.8		
Total		36	100.0		

Appendix 3C. Education level

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid		11	30.6	30.6	30.6
	8th Grade or Less	4	11.1	11.1	41.7
	Some high school, but did not graduate	2	5.6	5.6	47.2
	High School Graduate	8	22.2	22.2	69.4
	Undergraduate Degree	8	22.2	22.2	91.7
	Postgraduate degree	3	8.3	8.3	100.0
	Total	36	100.0	100.0	

Appendix 3D. Nationality of the Patient

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid					
	American	1	2.8%	3.3%	3.3%
	Australian	1	2.8%	3.3%	6.7%
	Brazilian	1	2.8%	3.3%	10.0%
	Egyptian	3	8.3%	10.0%	20.0%
	Emirati	16	44.4%	53.3%	73.3%
	Filipino	1	2.8%	3.3%	76.7%
	Indian	1	2.8%	3.3%	80.0%
	Jordan	1	2.8%	3.3%	83.3%
	Morocco	1	2.8%	3.3%	86.7%
	Pakistan	2	5.6%	6.7%	93.3%
	Sudan	1	2.8%	3.3%	96.7%
	Syria	1	2.8%	3.3%	100.0%
	Total	**30**	83.3%	100.0%	
	Missing	6	16.7%		
	Grand Total	36	100.0		

Appendix 3E. Age of the Respondent

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	under 18 years	7	19.4%	20.6%	20.6%
	18-24 years	4	11.1%	11.8%	32.4%
	25-34 years	7	19.4%	20.6%	52.9%
	35-49 years	11	30.6%	32.4%	85.3%
	50-64 years	4	11.1%	11.8%	97.1%
	80 above	1	2.8%	2.9%	100.0%
	Total	34	94.4%	100.0%	
Missing	System	2	5.6%		
Total		36	100.0%		

Appendix 3F. Marital Status

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Married	25	69.4	73.5	73.5
	Widowed	1	2.8	2.9	76.5
	Never Married	8	22.2	23.5	100.0
	Total	34	94.4	100.0	
Missing	System	2	5.6		
Total		36	100.0		

Appendix 3G How long were in you the hospital?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Less than a night	6	16.7	17.1	17.1
	1 night	10	27.8	28.6	45.7
	2-4 nights	15	41.7	42.9	88.6
	5-10 nights	3	8.3	8.6	97.1
	more than 10 nights	1	2.8	2.9	100.0
	Total	35	97.2	100.0	
Missing	System	1	2.8		
Total		36	100.0		

Appendix 3H. How many hospital visits have you had in the past year?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	less than 2 visits	9	25.0	33.3	33.3
	2-4 visits	10	27.8	37.0	70.4
	5-8 visits	1	2.8	3.7	74.1
	9-10 visits	6	16.7	22.2	96.3
	More than 12 visits	1	2.8	3.7	100.0
	Total	27	75.0	100.0	
Missing	System	9	25.0		
Total		36	100.0		

Appendix 3I. Gender of the Respondent

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Male	14	38.9	40.0	40.0
	Female	21	58.3	60.0	100.0
	Total	35	97.2	100.0	
Missing	System	1	2.8		
Total		36	100.0		

4. CHAPTER FOUR- The Case Study Analysis of the Predictors of Patient Experience at Al Noor Hospital

4.1 Introduction

4.1.1 Defining patient satisfaction and patient experience

In recent years, patient evaluations of healthcare have emerged as one of the most important indicators of quality of care. According to the Institute of Medicine (2001), patient experience is increasingly recognised as one of the three pillars of quality in healthcare alongside clinical effectiveness and patient safety. Researchers recommend that evaluation of patient perceptions should supplement quality indicators in healthcare (Avis, 1997; Cleary and McNeil, 1988; Donabedien, 1988). Furthermore, patient evaluations of care have been linked to certain healthcare related behaviours such as filing malpractice suits (Penchansky and McNee, 1994) and compliance with medical regimes, including adherence to follow up appointments (Hall *et al*., 1998). While there is great familiarity with the concept of patient satisfaction amongst caregivers, there is often confusion between it and patient experience. In the past few years, patient-reported outcome measures and real-time feedback have become much discussed but little understood.

Satisfaction surveys are quite common, but often criticised on the basis of conceptual problems and methodological weaknesses (Hall and Dornan 1988; Aharony and Strasser 1993; Carr-Hill 1992; Williams 1994; Draper and Hill, 1995; Sitzia and Wood, 1997). For example, although satisfaction is a multi-dimensional construct, there is limited agreement on what are the dimensions of satisfaction, and a poor understanding of what overall ratings actually mean. Dictionary definitions attribute the term 'satisfaction' to the Latin root 'satis', meaning 'enough'. Something that satisfies will adequately fulfil expectations, needs or desires, and by giving what is required, leaves no room for complaint. Two concerns result from this definition. Firstly, being satisfied with a service does not imply superior service, rather that an acceptable standard was achieved. Dissatisfaction is defined as discontent, or a failure to satisfy. It is possible that patients are satisfied unless something untoward happens, and that dissatisfaction is triggered by a critical event (Avis *et al*., 1995 and Baker, 1997). Secondly, satisfaction being a relative concept can only be measured against individuals' expectations; therefore what results in one person's satisfaction may result in another's dissatisfaction. Satisfaction ratings are attitudinal responses and provide subjective evaluations with great variability rather than an objective measures. Additionally, survey approaches have often reflected the concerns of managers and providers rather than that of the patients.

Concerns about the problems with patient satisfaction surveys have led to an emphasis on measuring patients' experience rather than satisfaction (Cleary *et al.*, 1992; Cleary, 1998). Satisfaction questions tend to ask patients to give subjective responses, in the form of ratings on a scale (from 'poor' to 'excellent'). For example, satisfaction surveys would ask 'How satisfied are you with care from the nurses?' while experience surveys would ask 'On a scale of never to always, how often did the nurse respond to the call bell within 5 minutes?' Satisfaction surveys have been found to be unreliable, and they do not provide specific factual information that can be used to improve quality (Jenkinson *et al*., 2002; Bleich *et al*., 2009). Typically patient satisfaction surveys elicit overwhelmingly positive ratings that do not accurately match the patients' experiences (Sizmur and Redding, 2009). Thus global satisfaction ratings can be misleading. Patient experience questions, by contrast, ask patients to give factual responses to questions about what did or did not happen during an episode of care. There are several advantages to using more direct patient experience reports rather than evaluative questions. Direct patient reports are an objective method for establishing trends over time and making comparisons across organisations or units. The patient experience surveys allow healthcare leaders to interpret the reasons for poor patient experiences and thus direct quality improvement interventions towards those areas of importance to the patient. Hence, patient experience surveys are a better tool for policy makers to assess, monitor and improve the quality of care. Table 4.1 below, summarises the differences between patient satisfaction and patient experience.

Table 4.1 Differences between patient satisfaction and patient experience

Satisfaction ratings reflect	Patients' experience ratings reflect
The personal preferences and expectations of the patient	Report in detail about their experiences of a particular service, hospital episode, or clinician
The perception of the quality of the care received	Confidence and trust in health professionals
Response tendencies due to personal characteristics	Involvement in treatment decisions
Global satisfaction ratings can be misleading	Being treated with dignity and respect
General evaluation categories (e.g., excellent, very good, good, fair, poor)	Access and waiting times
'Fair' or 'poor' doesn't give managers or clinicians a view of what to do to improve the quality of care	Quantifiable and actionable concerns e.g. 'Had to wait more than 15 minutes for the call button to be answered'
Patient's evaluation of what occurred	Questions are designed to discover what actually occurred
'How would you evaluate that experience?'	'What was your experience?'
General rating of their care tends to elicit more positive responses	Factual questions about events and occurrences

Source: adapted from literature review of Carr-Hill, 1992; Hall and Dorman, 1988; Sitzia and Wood, 1998; Fitzpatrick, 1991; Fitzpatrick, 2000; Fitzpatrick and Hopkins, 2000; Edwards and Staniszewska, 2000; Cleary and McNeil, 1988 and Cleary, 1999)

An understanding of the predictors of positive patient experience and attempts to foster those attributes have the potential to reap rewards to the healthcare organisations in terms of more effective use of healthcare resources, and to the individual patients in the form of better treatment outcomes. There is a dearth of literature concerning the various predictors such as patient demographic variables on patient experience scores. At the time of writing, this was the first study to be conducted on patient experience in the Middle East. However, literature, although sparse, does exist on the subject of patient satisfaction and patient demographics such as age etc. Regardless of how patient evaluations of care are modelled, patient satisfaction theories suggest that the determinants of patient expectations include socio-demographic factors such as age, education level, gender, racial or ethnic background (Kravitz, 1996). Although there are many examinations on patient satisfaction internationally, only a few address patient satisfaction in the Middle East. Two Kuwaiti reports (Bo Hamra and Al-Zaid, 1999; Al-Doghaither *et al.*, 2000) have found significant relationships between age, gender, nationality, marital status, education, occupation, and income and the dependent variable, patient satisfaction. Only two investigations of patient satisfaction have been conducted in the UAE. It is important to note that most of the research on patient satisfaction has been conducted in primary healthcare settings and specialised medical services or surgical procedures and therefore, they cannot be generalised to a multi-speciality acute care hospital setting. No research has focused on measuring patient experience with inpatient hospital services in the UAE or other Gulf countries. Additionally, assessment tools for measuring patient experience within an acute care setting have not been developed until now in this region. The primary objective of this chapter is to present a method for analysing and using patient experience data for quality improvement. The thesis also presents a method for producing a reliable and valid survey instrument to assess patient's experience of care in a Middle Eastern setting. The secondary objective is to identify the variables that contribute most to the variability in patient experience at the patient and hospital levels. Identification of the predictors of patient experience will empower policy makers at the regulatory level to focus on these and improve on the delivery of care. The knowledge of patient socio-demographic characteristics and its relationship to patient experience will permit healthcare providers to tailor care to meet the needs of patients at an individual level.

4.2 Predictors of patient experience

Surveys conducted in the United Kingdom (UK) show wide variations in patients' experience of NHS care according to patient characteristics (Commission for Health Improvement, 2004; Avery and Ehrens, 1999). Published findings by the UK Department of Health showed that Black and minority ethnic groups tended to have less positive patient experiences than the White majority (Department of Health, 2009). Other NHS investigations found that patient experience differed according to age, gender, education level, health status, type of trust, and emergency admission (Commission for Health Improvement, 2004, Healthcare Commission, 2006). These variations in patient experience are not exclusive to the United Kingdom (Young *et al.*, 2000; Bleich *et al.,* 2007). An examination of eight European countries found similar results (Coulter and Magee, 2003). Age is frequently associated with differing patient experiences of care (Bleich *et al.*, 2007).

Patient socio-demographic characteristics have been connected to patients' perceptions and/or to patient satisfaction include the following: gender (Crow *et al.*, 2002;

Danielsen *et al*., 2007); age (Jenkinson *et al*., 2002; Danielsen *et al*., 2007); educational level (Da Costa *et al*., 1999; Danielsen *et al*., 2007) and self-reported physical health (Da Costa *et al*., 1999; Kroenke *et al*., 1999). Some have reported that women rate their satisfaction with quality of care higher than men (Ware *et al.*, 1978; Hsieh and Kagle, 1991), while others have reported that women have significantly poorer scores than men (Danielsen *et al*., 2007; Findik *et al*., 2010). Furthermore, some analyses have found that gender is unrelated to patients' perception of quality of care (Linn and Greenfield, 1982; Hall and Dornan, 1990). Wilde *et al*. (1999) found no difference between men and women regarding actual care episodes, but women tended to give different care aspects higher subjective importance than men. Other research results are consistent with findings of similar satisfaction scores among men and women (Sack *et al*., 2011; Garcia-Aguilar *et al*., 2000). However, it is expected that women are more demanding of the quality of care, including nursing care. Therefore, it is hypothesised that males will record higher experience scores than females.

Studies showed that age is related to patient satisfaction and patient experience ratings. Older patients tend to rate their experiences and satisfaction with quality of care higher than younger patients (Sitzia and Wood, 1997; Jackson *et al*., 2001; Jenkinson *et al*., 2002; Thi *et al*., 2002; Commission for Health Improvement, 2004; Vukmir, 2006; Danielsen *et al*., 2007; Bleich *et al.*, 2007). According to Hall *et al*. (1990), age was the strongest correlate of satisfaction (r = 0.13). Another investigation conducted by Tehrani *et al*. (2011) suggested that elderly patients, who typically have more complicated medical conditions, tended to report higher satisfaction with their care than did younger patients. However these findings may be subject to respondent bias as it was an Internet-based survey; the self-reported data are subject to respondent recall bias and may have affected the survey responses that were received, especially from the elderly group. A randomised survey of 8428 patients from 39 hospitals (Schoenfelder *et al*., 2011) showed that patients' age was related to level of satisfaction ($P \leq 0.001$). One possible reason regarding the higher satisfaction rating of older study participants may be that older patients, with their complex and chronic conditions, develop long term relationships with care providers and are thus treated differently. Therefore, it is hypothesised that older patients will have higher experience scores than younger patients.

Education has been identified as having a significant impact on patients' perception of quality of care. High scores on quality of care are often associated with lower levels of education (Da Costa *et al.*, 1999; Danielsen *et al*., 2007; Findik *et al*., 2010). Similarly, it is hypothesised that the patients with higher education levels will be more discriminating than those with lower education levels and consequently have lower experience scores. Patients with higher education levels may have better access to health information and hence have higher expectations of care.

Patients self-reported health status has also been deemed important in influencing patient experience and patient satisfaction ratings. Patients who report a poor health status are more likely to report poorer satisfaction (William, 1998) and want more information (Commission for Health Improvement, 2004).

Research has shown that length of stay has an impact on patient's satisfaction: those hospitalised for lengthy periods were most satisfied (Findik *et al*., 2010). The quality of nursing care is significantly associated with satisfaction when patients stayed less than one week; while recovery of physical health, nursing care and respect for patients' opinions and feelings were statistically significant when patients stayed more than one week but less than one month. Relief from pain and respect for patient' opinions and feelings were significantly associated with satisfaction when patients were hospitalised for more than one month (Tokunaga and Imanaka, 2002).

The influence of nationality and ethnicity on patient satisfaction has also been documented. Patients from minority ethnic communities were more likely to report poor satisfaction than white British or Irish, but there were wide variations between different ethnic groups in the UK (William, 1998). The literature is inconsistent in terms of the patterns of patient satisfaction ratings between nationals and expatriates (Al-Shamekh, 1992; Abdul Al Kareem *et al.*, 1996; Al-Faris *et al.*, 1996; Makhdoom *et al.*, 1997; Bo Hamra and Al-Zaid, 1999; Saeed *et al.*, 2001; Mansour and Al-Osimy, 1993; Al-Doghaither and Saeed, 2000; Alhashem, 2009). Although the author has no knowledge of literature published on the relationship between nationality and patient experience in the Middle East, it is hypothesised that the indigenous population (Emirati) will be more discriminating than the expatriate population. As healthcare is free for the Emirati population in Abu Dhabi and they have the alternative to travel abroad for healthcare services, they may have higher expectations of care. It is also hypothesised that within the expatriate population, patients from developed western economies will have lower experience scores than patients from developing countries.

Patients experiences with nursing care were found to be directly associated with patients' perceptions of quality of care (Schmidt, 2004), patients' overall satisfaction with hospital stay and their propensity to recommend the hospital (Abramowitz *et al*., 1987). Moreover, nursing care was the most influential attribute in patients' rating of excellent experiences (Otani and Kurz, 2004; Otani *et al*., 2009; Otani, *et al*., 2010).

4.3 Data collection for patient experience study of Al Noor Hospital

The survey for this thesis was administered using face-to-face interviews based on a structured questionnaire. The interviewers included the researcher and a team of trained and competent assistants. The sample size was selected using Slovin's Formula as follows:

$n = N / (1 + Ne^2)$ where

n = Number of patients sampled

N = Total population

e = Error tolerance

Using the sample size for the number of inpatients in the hospital per month, the sample was determined using Slovin's Formula with 95% confidence interval and 1,700 inpatients per month:

$n = N / (1 + Ne^2)$

n = Sample size

N = 1,700

e = 0.05

$n = 1{,}700 / (1 + 1{,}700 \times 0.05^2) = 324$ patients.

In order to compensate for the response rate, missing data and patient refusal, 391 inpatients were interviewed using a standardised validated, reliable and piloted survey tool to evaluate their patient experience. The questionnaire was piloted by the researcher and described in the pilot study report (see Chapter Three). In order to identify the full range of issues that were important to patients, the survey covered the entire journey of care from admission to discharge. With the objective to minimise bias, there were no clinical limitations applied to the patient selection. Patients were selected from all wards and units within the hospital, on a daily basis, during a six-week period. Eligible subjects were all inpatients who stayed at least 24 hours in the hospital and due for discharge on the day of the survey. This method of selection was used to avoid recall bias. Patients were asked to rate their current hospital stay, as assessment of the quality of care might change over time (Aharony and Strasser, 1993). No exclusion criteria were applied as the sample needed to reflect the diversity of the patient population. Important demographic variables were also collected. A cover page was included in the survey, requesting consent, guaranteeing patients' confidentiality, explaining the subject of the survey and encouraging patients to complete it (Appendix 4. A).

4.4 Data analysis for patient experience of Al Noor Hospital

The determinants of patient experience were evaluated by estimating multivariate models using ordinary least squares (OLS) regression and logistic regression. The independent or explanatory variables are listed in Table 4.2 below. The statistical analysis explores the following main aspects:

- Respondents/ patients' characteristics (including socio-demographic and stay characteristics described in Table 4.2) were summarised using descriptive statistics (means, standard deviations or percentages).
- Multiple regression models were used to test hypotheses relating to the association between patient experience, patient characteristics and experience constructs described in Table 4.2 and Table 4.3.
- The dependent variables are the patient's experience rating of each item within the construct (e.g. care from nurses). The dependent variables included the five patient experience outcome measures [Overall rating of the hospital (Y_1), Willingness to return (Y_2), Willingness to recommend (Y_3), Overall global measures score (Y_4) and the Aggregated constructs score (Y_5)]. The measures (Y_1, Y_2 and Y_3) were measured on a 10-point scale. The Overall global measures score (Y_4), is the aggregate of the three measures (Y_1, Y_2 and Y_3) while the Aggregated constructs score (Y_5) is the aggregate of the 13 patient experience constructs. The process of construct development is described in Chapter Three. Construct-level scores were calculated as the aggregate of the scored item data, per patient, for all the items comprising that construct. This was used as a composite score to represent the individual constructs as the dependent variables for the multiple regression equations. The 13 patient experience constructs were experience ratings of: doctors, nurses, the discharge process, quality of hospital

food, cleanliness, operations and procedures, consistency and coordination of care, treatment with respect and dignity, involvement in decision making, patient rights and feedback, pain management, medication management (Table 4.3).

- Independent variables were entered into the equation in order of importance based predominantly on previous empirical evidence and, given the lack of theory, less on *a priori* theoretical considerations. These included the patient demographic variables e.g. age, nationality, gender, highest educational level etc. (Table 4.2). The composite scores were used represent the individual constructs as the independent variables for the regression equations ($Y_1 - Y_3$). Regression analysis was used to estimate the coefficients of the explanatory variables independently associated with experience outcomes such as the Overall rating of the hospital (Y_1), Overall global measures score (Y_4) and the Aggregated constructs score (Y_5). The 13 constructs (Table 4.2) were analysed using ordinary least squares regression.
- Logistic regression analysis was used to calibrate models for the categorical dependent variables- ratings of Willingness to return (Y_2) and Willingness to recommend (Y_3), as they were consolidated into binary variables. The scale 6-10 (More likely than not- Definitely) was consolidated and coded as '1' representing 'willing to return/recommend'. The scale 1-5(Never- Maybe) was pooled and coded as '0' representing 'not willing to return/recommend' (Table 4.4).
- All hypotheses tests with a $P \leq 0.05$ are considered significant.

Table 4.2 Independent (patient demographic) variables

Variable group	Reference group
Patient sociodemographic characteristics	
Gender (G_i) Male	Female
Age group (A_i) 25-34 years, 35-49 years, 50-64 years, 65-79 years, 80 years and over	Under 24 years old
Nationality (N_i) Emirati, Asian, African, Western,	Other Arab country
Overall self-reported general health (H_i) Excellent, Very good, Good, Fair	Poor
Education level (E_i) Some high school- but did not graduate, High school graduate, Undergraduate degree, Postgraduate degree	8th grade or less,
Marital status (M_i) Divorced, Widowed, Never married	Married
Hospital stay characteristics	
Length of stay (L_i) 2-4 nights, 5-10 nights, More than 10 nights	One night
Hospital visits in the past year (V_i) 2-4 visits, 5-8 visits, 8-10 visits, More than 12 visits	Less than 2 visits
Patient's outcome after hospital treatment/ operation (T_i) Not at all, A little, Somewhat, Quite a bit, A great deal	Worse than before

Table 4.3 Description of the dependent variables (patient experience survey constructs)

Constructs	Individual items	Variable type
Your Care From The Nurses (CN_1) ***Range of values of construct scores*** ***7-35***	1. Did the nurses treat you with courtesy and respect? 2. Did the nurses listen carefully to you? 3. Did the nurses explain things in a way you could understand? 4. Were there sufficient nurses on duty to care for you in hospital? 5. Did the nursing staff respond immediately to your call bell? 6. Did you have confidence and trust in the nurses treating you? 7. Did the nurses talk in front of you as if you weren't there?	Likert Scale of items is 1-5. Sum of items will equate to the construct as interval type data, (items within constructs are ordinal)
Your Care From The Doctors (CD_1) ***Range of values of construct scores*** ***5-25***	1. Did the doctors treat you with courtesy and respect? 2. Did the doctors listen carefully to you? 3. Did the doctors explain things in a way you could understand? 4. Did you have confidence and trust in the doctors treating you? 5. Did the doctors talk in front of you as if you weren't there?	
Cleanliness of the Hospital and Hand-Washing (C_1) ***Range of values of construct scores*** ***3-15***	1. Was the hospital room, toilets and ward kept clean? 2. Did the doctors wash or clean their hands before touching you? 3. Did the nurses wash or clean their hands before touching you?	
Consistency and Coordination of Care (CC_1) ***Range of values of construct scores*** ***2-10***	1. Did the doctors/nurses say different things? Sometimes in a hospital, doctors /nurses will say one thing and another will say something quite different. Did this happen to you? 2. Did the doctors and nurses work well together?	
Treatment with Respect and Dignity (RD.) ***Range of values of***	1. Overall, did you feel you were treated with respect and dignity while you were in the hospital? 2. Did discussions about your condition or treatment occur in private?	

construct scores 3-15	3. Were you given privacy while being examined or treated?	
Involvement in Decision Making (I_1) ***Range of values of construct scores 2-10***	1. Did you receive sufficient amount of information about your condition and treatment? 2. Did staff involve you in decisions about your care and treatment?	
Patient Rights and Feedback (PR_1) ***Range of values of construct scores 3-15***	1. Did you make a formal complaint while at the hospital? 2. Did the hospital staff encourage your feedback? 3. Were you made aware of your patient rights at the hospital?	
Your Pain Management in this Hospital (PM_1) ***Range of values of construct scores 3-15***	1. Did your doctors explain the amount of pain to expect? 2. Did your nurses explain the amount of pain to expect? 3. Was your pain well controlled?	
Your Medication Management in this Hospital (MM_1) ***Range of values of construct scores 2-10***	1. Were the purposes of all medications sufficiently explained to you? 2. Were the possible side effects of medicine explained to you?	
Management of Your Operations and Procedures (O_1) ***Range of values of construct scores 4-20***	**1.** Did the doctor explain the risks and benefits of the operation or procedure in a way you could understand? 2. Did the doctor explain beforehand what would be done during the operation or procedure? 3. Did the doctor answer questions about the operation/procedure in a way you could understand? **4.** Did the anaesthetist explain how he/she would put you to sleep or control your pain?	
When you left the hospital (LH_1) ***Range of values of construct scores 1-5***	1. Did you receive written information about how to manage your condition and recovery at home?	

Waiting for Admission (WA_1) ***Range of values of construct scores 3-15***	1. Were the admission staff helpful? 2. On admission, were you provided with sufficient information about your stay? 3. How long did you wait for a bed after you arrived at the hospital?	
Quality of hospital food (F_1) ***Range of values of construct scores 2-10***	1. Were you satisfied with the quality of the hospital food? 2. Were you satisfied with the temperature of the hospital food?	
Global measures		
Overall rating of the hospital during the stay? (Y_1) ***Range of values of construct scores 1-10***		Rating Scale is 1-10
Rating of willingness to return to the hospital if needed. (Y_2) ***Range of values of construct scores 1-10***		Data is assumed to approximate an interval level variable
Rating of willingness to recommend the hospital to family and friends (Y_3) ***Range of values of construct scores 1-10***		

4.5 Model development of patient experience rating

4.5.1 Multiple regression model

The aim of the multiple regression analysis is to fit a predictive model to our data and use this model to predict values (the outcome) of the dependent variable from several predictors. The primary regression model used in the patient experience study is that of the ordinary least squares (OLS) model.

$$Y= \beta_0+ \beta_1X_1+ \beta_2X_2+ \beta_3X_3+...+ \beta_nX_n+e_1$$

Equation 4.1

- Y is the *dependent variable* whose variance is to be explained by a number of independent variables X_1, X_2....X_n in the model. In this case, the dependent variable is the patient experience rating.
- β_0 is the Y intercept
- β_n is the regression coefficient associated with variable $_n$

- The X represents the value of the *independent/predictor variables*. The independent variables are the patient stay and socio-demographic characteristics and the survey constructs (doctors, nurses, operations and procedures, cleanliness, quality of hospital food, admission, discharge, cleanliness, medication management, pain management, consistency and coordination of care, respect and dignity, patient rights and feedback and involvement).

- e_1 is the *error term.*

The goodness-of–fit of the model was assessed using R^2 which expresses the variance in the dependent variable explained by the model (*model sum of squares)* relative to the (*total sum of squares).*

In order to test the significance of the individual predictors, the *t-statistic* was used. A $P \leq 0.05$ was considered statistically significant.

Variables were assessed to ensure that they did not violate the assumptions of linearity, homeoscedacity and multicollinearity. In order to assess whether the underlying assumptions for the regression model have been met, the following assumptions were tested:

- Assessment of variable types: all predictor variables were either interval or categorical. The outcome variable was continuous and interval.
- Test for multicollinearity: High levels of collinearity can lead to inflated standard errors and increase the probability that a good predictor of the outcome will be found not significant and rejected from the model (Field, 2005). In order to assess the severity of correlation between the predictor variables, the variance inflation factor (VIF) was used. The VIF is representative of the amount that the variance of each regression coefficient is increased over that with uncorrelated independent variables (Keith, 2006). If the largest VIF is greater than 10 then it was considered to be multicollinear (Myers, 1990; Keith, 2006).
- Test for linearity: To test for non-linearity, a Pearson correlation matrix of all predictor variables was reviewed to see of any correlate highly (i.e. correlations above 0.80). The correlation coefficients revealed that the assumption for linearity between the predictor variables was met. However, the preferred method for detecting non-linearity is examination of residual plots (plots of the standardized residuals as a function of standardized predicted values), as the

residuals magnify the departure from linearity (Pedhazur, 1997; Stevens, 2009). To assess whether the linearity assumption is tenable, the scatterplots of the residuals were examined for curvature.

- Test for homoscedasticity: Homoscedasticity is the assumption that at each level of the predictor variables, the variance of the residual around the regression line is a constant for all values of the predictor variable. When heteroscedasticity is present, it can alter the findings and weaken the analysis thus, increasing the likelihood of a Type I error and erroneous conclusions (Osborne and Waters, 2002). This assumption was checked using histogram and normal probability plots of the regression standardised residuals (the errors) against the regression standardised predicted values for the models (Field, 2005; Osborne and Waters, 2002).

4.5.2 Logistic Regression Model

Like multiple regression, logistic regression analyses the relationship between multiple independent variables and a dependent variable to yield a predictive equation. However, in logistic regression analysis the dependent variable is dichotomous. The dependent variable is coded as 0 or 1, where 1 indicates that the outcome of interest is present, and 0 indicates that the outcome of interest is absent. Applying linear regression as the best-fit line might lead to Y estimate values exceeding 0 and 1.

The formula below shows the relationship between the linear regression equation ($\beta_0 + \beta_1 X_1 + \beta_2 X_2 ...$) and the logistic regression equation.

$$\text{logit}\,[p(x)] = \log\,[\,p(x)/\,(1-p(x)\,] = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \beta_4 X_4 ... \qquad \text{Equation 4.2}$$

Although it appears that linear regression is the best fitting equation, the principles on how it does, is different. Instead of using the least squares deviations for best fit, logistic regression equations are calibrated by maximum likelihood methods that maximise the probability of obtaining the observed results given the fitted regression equations. Logistic regression is based on the assumption that the underlying relationships among variables are an S-shaped probabilistic function as opposed to the least squares assumptions of linearity and multivariate normality.

The assumptions of logistic regression include the following:

- Requires the dependent variable to be binary.
- The logistic regression assumes that P (Y=1) for the dependent variable represents the desired outcome.
- The model should be fitted correctly using all meaningful variables.
- Logistic regression requires each observation to be independent and does not assume linear relationship between dependent and independent variables.

Therefore, if p is defined as the probability that the outcome is 1, the multiple logistic regression model can be written as follows:

$$\pi(x) = \frac{e^{\beta o+\beta_1 X}}{1 + e^{\beta o+\beta_1 X}} \qquad \text{Equation 4.3}$$

The logistic function is useful because it can take any value from negative infinity to positive infinity, whereas the output $\boldsymbol{\pi(x)}$ is confined to values between 0 and 1 and hence is interpretable as a probability. $\boldsymbol{\pi(x)}$ is the probability that describes the possible outcomes of a single trial as a function of the explanatory (predictor) variables; βo is the intercept from the linear regression equation (the value of the criterion when the predictor variable is equal to zero); β_1X is the regression coefficient multiplied by the value of the predictor variable ; *e* denotes the exponential function. The formula for $\boldsymbol{\pi(x)}$ illustrates that the probability of the dependent variable equalling a case (a success) is equal to the value of the logistic function of the linear regression expression. Logistic regression was used to predict the odds of being a case based on the values of the independent variables (predictors). The odds are defined as the probability that a particular outcome is a success divided by the probability that it is not a success. The values of the parameters are estimated using maximum likelihood methods, which select coefficients that make the observed values most likely to have occurred. The models provide regression coefficients of independent variables, antilogs of which are odds ratios (OR) expressing the effect, when changing one unit of the independent variable, on the probability of having a higher rather than a lower experience level, holding other variables in the equation model constant (OR are given with their 95% confidence limits). The level of significance for variables retained in the multivariate models was set at 0.05. The Wald statistic was used to evaluate whether the β coefficient for that predictor is significantly different from zero. If the coefficient is significantly different from zero, then we can assume that the predictor is making a significant contribution to the prediction of the outcome variable.

As the R^2 measure is only appropriate to linear regression, the Hosmer Lemeshow test was used to assess goodness-of-fit. This test indicates the extent to which the model provides a better fit than a null model with no predictors. Although this test is similar to a χ^2 goodness of fit test, it is preferred because it partitions the observations into equivalent sized groups and hence there are less likely to be groups with very low observed frequencies. If the Hosmer Lemeshow statistic is not significant then the model has adequate fit. Logistic Regression Models were estimated for the following dependent variables: (i) Willingness to return (Y_2) and (ii) Willingness to recommend (Y_3). The most discriminating variables within the final model were chosen using the criteria related to goodness of fit of the overall model, the Hosmer and Lemeshow value and the significance of the logit coefficients using the Wald statistic.

4.6 Model building strategy

Model building was based on a logical process with the objective to develop an economical model (with a minimum number of independent variables) that explains maximum variation in the dependent variables related to patient experience. The modelling strategy involved two extreme models, which are conceivable for any set of data, the minimal model that contains the smallest set of terms that the problem allows, and the completed (saturated) model. Saturated models, which involve a large number of parameters, will usually fit the data better than simpler models and are preferred on the grounds of parsimony. Therefore the model building process consists of moving from the minimal model towards a saturated model. *A priori* theoretical criteria are important in achieving an acceptable model that is theoretically and substantively meaningful with statistically significant parameters which achieves parsimony and good fit. The experimental approach was adopted, starting with a minimal model where a limited number of predictor variables based on *a priori* theory and previous empirical evidence were selected. Then the researcher successively introduces other variables in order of postulated importance (O'Farrell, 1986 p.75). In addition, the interpretation of the change in the R^2 was used to evaluate how much predictive power was added to the model by the addition of another variable. This analysis of the variables adds to the researcher's understanding of the predictors of patient experience and it requires interpretative input by the researcher in determining the order of the independent variables consequently yielding successive tests of the validity of the hypotheses which determine the order of importance. A parsimonious model is therefore required in which the number of parameters for the adequate fit is as small as possible. Both the orthodox econometric approach with its *a priori* assumptions, and the experimental method with its *a posteriori* choices has a certain degree of arbitrariness; but Koutsoyiannis (1997, p. 25) has argued that using the same sample to estimate various models is essential if econometrics is to be helpful in testing theory. When evaluating the estimates, *a priori* theoretical criteria defining the sign of the coefficients take precedence in most instances over statistical criteria. Finally, econometric criteria aimed at testing the assumptions of the statistical model employed, are used to determine the reliability of the statistical criteria and the parameter estimates.

Most research papers reviewed in the literature on patient satisfaction have used stepwise regression, which is the alternative method to the experimental approach. Here decisions about the order in which predictors are entered into the model are based purely on statistical criteria. Initially the computer searches for the individual variable that is best correlated with the outcome variable. This predictor is retained in the model and the computer searches for a second predictor. The predictor that accounts for the most remaining variance is included in the equation. This process is repeated until the addition of a remaining independent variable does not increase the R^2 by a significant amount (or until all variables are entered). Alternatively, the backward method can be used, starting with all variables and eliminating independent variables one at a time until the elimination of one makes a significant difference to the R^2. There is widespread recognition of the limitations of stepwise multiple regression (Grafen and Hails, 2002; Stephens *et al*., 2005). Stepwise regression is inappropriate for testing theory because it capitalises upon random variations in the data and produces results that are difficult to replicate in any sample other than the sample in which they were originally obtained. Due to over-fitting and biases in parameter estimations, stepwise methods can yield excessively high R^2 values, significance tests which are too lenient, and narrow confidence intervals thus inflating the probability of Type 1 errors. Therefore the experimental approach was preferred over stepwise regression. This is the first study, on patient experience in the Middle East, to use the experimental approach to model building.

Thus the *a priori* rationale and the explanatory variables modelled are reflected in Table 4.4 and in the equation below:

Y(Patient experience) $=\beta_1$(patient socio-demographics) + β_2(patient stay characteristics) + β_3(survey constructs)

Equation 4.4

Regression models were estimated for five patient experience dependent variables, namely: (i) Overall rating of the hospital (Y_1) (Table 4.5), (ii) Willingness to return (Y_2) (Table 4.6), (iii) Willingness to recommend (Y_3) (Table 4.7), (iv) Global measures score (Y_4) (composite of Y_1, Y_2 and Y_3) and (v) Aggregated constructs score (Y_5) (the aggregate of all item scores). The interval level variable, the Aggregated constructs score (Y_5), was determined through the calculation of the aggregate of the items scores for each construct.

The experimental approach specified above for the model building used the *a priori* criteria and previous research, to specify the order of importance and the direction of the independent variables. Multivariate models were calibrated for the independent variables at the patient level (socio-demographic characteristics including age, education level, marital status, gender and nationality) and hospital level (length of stay, number of visits and outcome of treatment). According to the literature, age, is the strongest and most consistent predictor of patient satisfaction, in previous studies (Cleary and McNeil, 1988; Ware and Berwick, 1990) and therefore this variable was entered first. The models containing dummy variables for the various categories (e.g. age) were calibrated. The *t*-values of the coefficients were analysed and employed as an approximate guide to the significance of the variable in the regression model. The insignificant dummy variable categories were pooled into the reference group and the model was recalibrated.

Example:

The overall hospital rating is a dependent variable ranging from 1-10 and is assumed to approximate an interval level variable and so OLS was used. The overall rating of the hospital may be written in its general form as:

$$Y_1 = f\ \{[A_i, N_4, E_i, G_i,] + [L_i, O_i] + [CN_1, CD_1]\} \qquad \text{Equation 4.5}$$

Thus the equation is

$$Y_1 = \beta_0 + \beta_1 A_i - \beta_2 N_4 + \beta_3 G_i - \beta_4 L_i + \beta_5 T_i + \beta_6 CN_1 + \beta_7 CD_1 + e \qquad \text{Equation 4.6}$$

Where Y_1= the overall rating of the hospital

A_i = the age of the patient. Older patients will rate the hospital higher thus β_1 is positive

N_4= nationality where Emirati patients will rate the hospital lower β_2 is negative

G_i= gender, men will rate the hospital higher (β_3 is positive)

L_i= length of stay, patients with longer stays rate the hospital lower (β_4 is negative)

T_i= treatment outcome, patients with a positive treatment outcome will rate the hospital higher (β_5 is positive)

CN_1= care from nurses, patients who rated their care from nurses higher will rate the hospital higher (β_6 is positive)

CD_1 = care from doctors patients who rated their care from doctors higher will rate the hospital higher (β_7 is positive)

e = the error term

Multivariate models were calibrated, as above, using the patient experience outcome ratings (Overall rating of the hospital- Y_1, Aggregated constructs score- Y_5 and Overall global measures score- Y_4) as dependent variables and the patient demographics and composite scores of the survey constructs (except for Y_5) as independent variables to examine which of the variables (Table 4.4) influence patient experience. The logistic regression models for the dependent variables (Willingness to return- Y_2 and Willingness to recommend- Y_3) and independent variables were fitted using the same process.

Table 4.4 Dependent and Independent variables

Variables	Code	Description	Reference group
Dependent Variables- Five Patient Experience Outcome Measures			
Overall Rating of the Hospital	$\mathbf{Y_1}$	Rating of the Hospital (Ranges from 1-10) Interval level	
Willingness to return to the hospital for treatment	$\mathbf{Y_2}$	1-Willing to Return, [6-10 (More likely than not- Definitely)] 0-Not willing to Return, [1-5 (Never-Maybe)]	
Willingness to recommend to their family and friends	$\mathbf{Y_3}$	1- Willing to Recommend- [6-10 (More likely than not-Definitely)] 0- Not Willing to Recommend- [1-5(Never- Maybe)]	
Overall global measure score	$\mathbf{Y_4}$	The aggregate of the 3 global measures; overall rating, willingness to return and willingness to recommend (Ranges from 3-30)	
Aggregated constructs score	$\mathbf{Y_5}$	The aggregate of the 13 patient experience constructs (Ranges from 13-65)	
Independent Variables			
Demographic variables			**Reference group**
Overall General Health Status (self-reported)	$\mathbf{H_1}$	1-positive result (excellent –fair) 0-negative result (poor)	
Education	$\mathbf{E_1}$	1- (Some high school- but did not graduate),	0- (8th grade or less),
	$\mathbf{E_2}$	1-(High school graduate),	
	$\mathbf{E_3}$	1-(Undergraduate degree)	
	$\mathbf{E_4}$	1-(Post graduate degree),	
Nationality	$\mathbf{N_1}$	1-(Africa),	Other Arab Country
	$\mathbf{N_2}$	1-(Asian Country),	
	$\mathbf{N_3}$	1-(Western Country),	
	$\mathbf{N_4}$	1-(Emirates),	

Age	**A_1**	1-(25-34 years)	0- under 24 years Old
	A_2	1- (34-49 years old),	
	A_3	1-(50 years and above)	
Marital Status	**M_1**	1 (Widowed)	0--(Married),
	M_2	1-(Divorced),	
	M_3	1-(Never Married),	
Length of Stay	**L_1**	1-(2-4 nights),	1 night
	L_2	1-(5-10 nights),	
	L_3	1-(More than 10 nights),	
Number of Hospital Visits over the past year	**V_1**	1-(2-4 visits)	Less than 2 Visits
	V_2	1-(5-8 visits),	
	V_3	1-(8-10 visits)	
	V_4	1- More than 12 visits	
Gender	**G_1**	1-(Male),	0-(Female)
Hospital Treatment	**T_1**	1-(positive result), 0-(negative result)	
	Patient experience constructs		
Care from Nurses	**CN_1**	Aggregate Score of the patient's rating of items for 'Care from Nurses'	
Care from Doctors	**CD_1**	Aggregate Score of the patient's rating items for 'Care from Doctors'	
Operations and Procedures	**O_1**	Aggregate Score of the patient's rating of items for Operations and Procedures	
Cleanliness	**C_1**	Aggregate Score of the patient's rating of items for Cleanliness	
Consistency and Coordination of care	**CC_1**	Aggregate Score of the patient's rating of items for Consistency and Coordination of Care	
Treatment with Respect and Dignity	**RD_1**	Aggregate Score of the patient's rating of items for Treatment with Respect and Dignity	
Involvement	**I_1**	Aggregate Score of the patient's rating of items for Involvement of Patient	
Pain management in the Hospital	**PM_1**	Aggregate Score of the patient's rating of items for Pain Management in the Hospital	

Medication Management in the Hospital	**MM_1**	Aggregate Score of the patient’s rating of items for Medication Management in the Hospital
When You Left The Hospital	**LH_1**	Aggregate Score of the patient’s rating of items for When You Left The Hospital
Waiting For Admission	**WA_1**	Aggregate Score of the patient’s rating of items for Waiting For Admission
Quality of hospital food	**F_1**	Aggregate Score of the patient’s rating of items for Food

Table 4.5 Overall rating of the hospital (frequency table)

Rating Scale	Frequency counts	%
1	1	0.26%
2	1	0.26%
3	1	0.26%
4	3	0.77%
5	15	3.84%
6	13	3.32%
7	35	8.95%
8	91	23.27%
9	93	23.79%
10	138	35.29%
Missing/Unspecified	0	0.00%
Grand Total	**391**	**100.0%**

Table 4.6 Willingness to return (frequency table)

Willingness to Return	N	%
Never	1	0.26%
Very unlikely	0	0.00%
Fairly unlikely	3	0.77%
Unlikely	2	0.51%
Maybe	20	5.12%
More likely than not	8	2.05%
Fairly likely	15	3.84%
Likely	58	14.83%
Very likely	82	20.97%
Definitely	202	51.66%
Grand Total	**391**	**100.0%**

Table 4.7 Frequency table of 'Willingness to recommend'

Willingness to Recommend	N	%
Never	1	0.3%
Very unlikely	0	0.0%
Fairly unlikely	0	0.0%
Unlikely	1	0.3%
Maybe	20	5.1%
More likely than not	11	2.8%
Fairly likely	17	4.3%
Likely	52	13.3%
Very likely	70	17.9%
Definitely	219	56.0%
Grand Total	**391**	**100.0%**

4.7 Results for patient experience of Al Noor Hospital

4.7.1 Frequency distribution of Respondent/Patient Demographics

The survey achieved a 100% response rate due to the survey administration method (Appendix 4.A[1]). The majority of the patients rated their health as excellent, whilst only 1.03 % or 5 patients rated their health as poor (Appendix 4.B). Most of the respondents had an undergraduate degree (36.57%) whilst 48 patients had an education level of 8th grade or less (12.03%) (Appendix 4.C). Appendix 4.D shows that the largest national group was from the Emirates (32.23%) while other Arab Countries (excluding UAE) accounted for 39.10%. The majority of respondents were between the ages of 25-34 years old (40.41%) with the fewest respondents from the age category of 80 years old and above (Appendix 4.E). Some 77.24% of patients were married (Appendix 4.F). More than half (54.73%) of the patients had stayed in the hospital for 2-4 nights (Appendix 4.G). Most patients (33.50%) had 2-4 hospital visits in the past year (Appendix 4.H). The predominance of female respondents (58.06%) was due to the hospital's busy maternity service (Appendix 4.I). Appendix 4.J showed that more than half (58.82%) of the patients reported that the hospital treatment/operation improved their health problem a great deal. Appendix 4.K shows that most items in the constructs were rated highly except for: 'did nurses and doctors talk in front of you as if you weren't there?' where approximately 20% of patients responded as 'always' with 5.57% of patients stating that they never have trust in the doctors treating them. Additionally, within the 'consistency and coordination of care' construct, 17.65% of patients stated that nurses and doctors always say different things. The number of respondents that made a formal complaint while at the hospital was 6.29%. Similarly 6.28% of patients reported that discussions about their condition never occurred in private. Approximately 7% of participants reported that they waited more than 1 hour for a bed during admission. Only 57% of patients were always satisfied with the temperature and quality of hospital food. Patients ranked "Care from Doctors" as being the most important construct (Table 4.8).

[1]Appendix 4.A-4.K are located in the Appendix section of this chapter

Table 4.8 Patients' ranking of domains in the order of importance (from 1-10)

Domain	Total	Rank
Your Care From The Doctors	2.08	1
Your Care From The Nurses	2.78	2
Treatment With Respect And Dignity	4.45	3
Cleanliness Of The Hospital And Hand-Washing	4.93	4
Consistency And Coordination Of Care	5.81	5
Your Pain Management In This Hospital	5.96	6
Patient Rights And Feedback	6.10	7
Involvement In Decision Making	6.60	8
Your Medication Management In This Hospital	6.81	9
Management Of Your Operations And Procedures	7.10	10

4.7.2 Explanatory Statistics

Calibration of the five models for Patient experience outcome measures [Overall Hospital Rating (Y_1), Willingness to Return (Y_2) and Willingness to Recommend (Y_3), Overall Global Measures Score (Y_4) and Aggregated Constructs Score (Y_5)]

4.7.2.1 Objective of the Study

The main objectives of the study were to determine the variables that are associated with the five patient experience outcome measures. The Overall hospital rating from 1-10 (Y_1), Overall global measures score (Y_4) and the Aggregated constructs score (Y_5) were analysed using OLS. Willingness to return to the hospital for treatment (Y_2), and Willingness to recommend to their family and friends (Y_3) were analysed using logistic regression analysis.

4.7.2.2 Methodology

4.7.2.2.1 Dependent and Independent Variables

The data were collected on 391 patients. Table 4.4 illustrates the dependent and independent variables. The independent variables are the composite scores of patient experience constructs in the hospital during their stay and their demographic Statistics. Self-reported General Health Status, Education, Nationality, Age, Marital Status, Length of Stay, Number of Visits, Gender, and Hospital Treatment were coded as dummy variables. The Composite Scores of the patient experience constructs, Care from Nurses, Care from Doctors, Operations and Procedures, Cleanliness, Consistency and Coordination of Care, Treatment with Respect and Dignity, Involvement, Pain Management in the Hospital, Medication Management in the Hospital, When You Left the Hospital, Waiting for Admission, and Quality of Hospital Food were computed as the aggregate of the items within the construct.

4.7.2.3 Analysis of the Data

Based on the experimental modelling strategy specified above, the model building process consisted of moving from the minimal model (with the initial specified equation) towards a saturated model and subsequently to the final parsimonious model. Starting with the specified initial model, the order in which the variables were introduced into the model was determined prior to the model fitting by *a priori* theoretical considerations and evidence from other empirical research. The postulated importance of the independent variables was based primarily upon empirical evidence because the field of patient experience lacks rigorous theory. From the patient demographic variables, age is documented as the strongest and most consistent predictor of patient satisfaction (Cleary and McNeil, 1988; Ware and Berwick, 1990), and hence was entered first. From the literature, the most important patient experience construct variables, namely care from nurses (Schmidt, 2004; Abramowitz *et al*., 1987) and care from doctors, were specified in the initial model (Table 4.9). Then adopting an experimental method, variables such as length of stay (Findik *et al*., 2010), nationality, hospital treatment outcome, and gender were tested. The initial specified equation is as follows:

$$Y_1 = \beta_0 + \beta_1 A_i - \beta_2 N_4 + \beta_3 G_i - \beta_4 L_i + \beta_5 T_i + \beta_6 CN_1 + \beta_7 CD_1 + e \qquad \text{Equation 4.7}$$

Where Y_1= the overall rating of the hospital (scale from 1-10 assumed to approximate an interval level variable)

A_i = the age of the patient. Older patients will rate the hospital higher thus β_1 is positive

N_4= nationality where Emirati patients will rate the hospital lower thus β_2 is negative

G_i= gender, men will rate the hospital higher (β_3 is positive)

L_i= length of stay, patients with longer stays will rate the hospital lower (β_4 is negative)

T_i= treatment outcome, patients with a positive treatment outcome will rate the hospital higher (β_5 is positive)
CN_1= care from nurses, patients who rated their care from nurses higher will rate the hospital higher (β_6 is positive)
CD_1 = care from doctors patients who rated their care from doctors higher will rate the hospital higher (β_7 is positive)
e = the error term

The above initial model was calibrated (Table 4.9). The constructs 'care from nurses' and 'care from doctors' were significant in the model. The age dummy variables were not significant predictors of the overall hospital rating (Y_1) and age was removed from the equation. The nationality effect, with 'other Arab countries' in the reference group, improved the goodness-of-fit but only the Emirati group was significant (N_4). Hence, all other nationality groups (Africa, Asia and Western country) were pooled in the reference group. Similarly, gender and length of stay were not significant in the model. However, hospital treatment outcome was significant. The initial model had an R^2 of 0.30 (Table 4.9). A saturated model was fitted with the addition of further categorical variables (number of hospital visits, health status, education level and marital status) and interval variables (aggregate scores for the other 11 patient experience constructs such as 'pain management', 'cleanliness', etc.) in order to move to a more parsimonious model. The independent variables such as health status, number of hospital visits, education level and marital status were not significant and therefore removed from the model. Similarly, the patient experience constructs that were not significant were removed from the saturated model in order to achieve a parsimonious model with a minimum number of parameters. The parsimonious model is summarised in Table 4.10. The results of the model fitting process, with variables entered in order of importance to achieve a parsimonious model, suggests that the probability of a positive Overall hospital rating (Y_1) is influenced by the following predictor variables, in order of importance: Care from the nurses, Hospital treatment outcome (1-'Positive', 0-'Negative'), Pain management in the hospital, Nationality (1-'Emirates', 0 'Otherwise'), Care from the doctors, and Cleanliness.

Based on the above, the regression equation for the most parsimonious model which explains 35% of the total variation in Y1 is:

$$Y_1 = -2.06 + 1.09CN_1 + 1.44T_1 - 0.40N_4 + 0.37CD_1 + 0.24C_1 + 0.29PM_1 + e$$

Equation 4.8

The multicollinearity assumption was satisfied as the VIF (βi) was close to one, based on the Tables 4.9 and 4.10. Evaluation of the histogram and normal probability plots of the regression standardised residuals against the regression standardised predicted values for the models revealed that the points in the plot were randomly and evenly distributed thus indicating that the assumptions for linearity (r = 0.55) and homoscedasticity were met.

4.7.2.4 Results and Discussion for Multiple Regression Analysis

4.7.2.4.1 Overall rating of the Hospital (Y_1)

Table 4.9. Initial model for the overall rating of the hospital (Y_1)

Variables		**Coefficients**	**t-value**	**Significance (p-value)**	**R Square**	**Overall Significance of the Model**	**Diagnostic Test: Collinearity Statistics (VIF)**	**Diagnostic Test: Linearity test**
	(Constant)	-1.10	-1.13	0.26				
Nationality	N1	-0.03	-0.14	0.89			1.14	
	N2	-0.22	-1.08	0.28			1.21	
	N3	-0.28	-0.92	0.36			1.09	
	N4	-0.48	-3.04	0.00*			1.26	
Age	A1	-0.09	-0.48	0.63			1.84	
	A2	0.07	0.33	0.74			1.66	
	A3	-0.25	-1.12	0.26			1.65	
Length of Stay	L1	-0.02	-0.14	0.89	0.30	0.000*	1.33	Linear based on plot r = 0.55
	L2	0.00	-0.01	1.00			1.29	
	L3	-0.36	-0.98	0.33			1.14	
Gender	G1	-0.16	-1.14	0.25			1.14	
Hospital Treatment	T1	1.39	2.79	0.01*			1.03	
Care from Nurses	CN1	1.32	8.19	0.00*			1.32	
Care from Doctors	CD1	0.51	3.05	0.00*			1.31	

Table 4.10 Parsimonious model for overall rating of the hospital (Y_1)

Predictor variables	**β Coefficients**	***t*-value**	***P***	**95% Confidence Interval for B**		**Diagnostic tests**		**R-Squared**	**Overall Significance of the Model**
				Lower Bound	Upper Bound	VIF	Linearity		
(Constant)	-2.06	-2.25	0.03	-3.86	-0.26		Linear based on plot $r = 0.59$	0.35	0.000*
CN_1 Care from Nurses	1.09	6.70	0.00	0.77	1.41	1.42			
PM_1 Pain Management	0.29	3.28	0.00	0.11	0.46	1.18			
T_1 Hospital treatment outcome	1.44	2.98	0.00	0.49	2.38	1.01			
N_4 Nationality	-0.40	-2.90	0.00	-0.67	-0.13	1.01			
CD_1 Care from Doctors	0.37	2.21	0.03	0.04	0.70	1.37			
C_1 Cleanliness	0.24	2.10	0.04	0.02	0.47	1.22			

4.7.2.4.2 Calibration of the model for the Overall global measures score (Y_4) (Aggregate of the three Global Measures= $Y_1+Y_2+Y_3$)

The order in which the variables were introduced in the model was decided prior to the model fitting by *a priori* theoretical considerations and principally upon the basis of evidence from other research. The initial model was calibrated using the same variables specified above (see Section 4.7.2.3). Hospital treatment outcome ($P \leq 0.04$), 'care from nurses' and 'care from doctors' were significant in the initial model (Table 4.11). The age effect, with 'under 24 years' in the reference group, is not significant. Therefore age was removed from the equation. Both gender and length of stay were also not significant. The nationality effect, with 'other Arab countries' in the reference group improved the goodness-of-fit but only the Emirati group was significant (N_4), and all other nationality groups (Africa, Asia and Western country) were pooled in the reference group. The R^2 for the initial model was 0.37 (Table 4.11). The other independent variables were sequentially added to the initial model and insignificant variables, including number of hospital visits, marital status and education level were removed from the equation in order to move to a more parsimonious model. The variable, hospital treatment outcome (T_1), was not significant in the saturated model ($P \leq 0.08$) and was removed from the model. The same process was followed with the remaining 11 patient experience constructs.

The final parsimonious model shows that there are six independent variables- Nationality (**N_4**), Self-reported health status (H_1), Nurses (**CN_1**), Doctors (**CD_1**), Cleanliness (C_1) and Quality of hospital food (**F_1**) that are significantly related to the overall global measures score (Y_4) (Table 4.12). The directions of the relationship previously specified are as expected. The assumption for multicollinearity was satisfied as the VIF (βi) was close to one. Additionally, the assumptions for linearity (r = 0.62) and homoscedasticity were satisfied as the histogram and normal probability plots of the regression standardised residuals against the regression standardised predicted values for the models were randomly and evenly distributed. The coefficient of determination (R^2) suggests that 38% of the total variation in the overall global measure score is explained by the model.

Then, the regression equation for Y_4 can be written as:

$$Y_4 = 1.19 - 1.40N_4 + 3.24CN_1 + 1.23CD_1 + 1.81H_1 + 0.63C_1 + 0.50F_1 + \varepsilon_i \qquad \text{Equation 4.9}$$

Care from nurses has the largest beta coefficient and is the strongest explanatory factor with regard to the overall global measures score, demonstrating that a 1 unit increase in the ‘care from nurses’ score will result in an increase of 3.24 units in the overall global measures score. The second strongest predictor was the patient’s self-reported health status followed by Nationality. Emirati nationals were more critical that other nationalities and gave the hospital a lower global measures score. Care from doctors was the third strongest explanatory factor in the overall global measures score. Therefore a 1 unit increase in the ‘care from doctors’ score will result in a 1.23 units increase in the global measures score.

Table 4.11 Initial Model for overall global measures score (Y_4)

Variables for the Initial Model (Y_4)		**Unstandardised Coefficients**		**Standardised Coefficients**	***t***	**Sig.**	**95.0% Confidence Interval for B**		**Collinearity Statistics**		**R Square**	**Linearity**	**Sig.**
		B	Std. Error	Beta			Lower Bound	Upper Bound	Tolerance	VIF			
	(Constant)	-0.60	2.44		-0.25	0.81	-5.40	4.20			0.37	Linear based on plot *r*= 0.60	.000 [a]
Nationality	N1	-0.43	0.59	-0.03	-0.74	0.46	-1.60	0.73	0.88	1.14			
	N2	-0.73	0.52	-0.06	-1.39	0.16	-1.75	0.30	0.83	1.21			
	N3	0.20	0.78	0.01	0.26	0.80	-1.33	1.73	0.91	1.10			
	N4	-1.59	0.39	-0.19	-4.04	0.00*	-2.37	-0.82	0.80	1.26			
Age	A1	-0.09	0.45	-0.01	-0.20	0.84	-0.98	0.80	0.54	1.84			
	A2	-0.13	0.51	-0.01	-0.26	0.79	-1.14	0.87	0.60	1.66			
	A3	-1.07	0.56	-0.10	-1.91	0.06	-2.18	0.03	0.61	1.65			
Length of stay	L1	-0.05	0.38	-0.01	-0.14	0.89	-0.80	0.69	0.75	1.33			
	L2	-0.23	0.63	-0.02	-0.37	0.71	-1.47	1.01	0.77	1.30			
	L3	-0.70	0.91	-0.03	-0.77	0.44	-2.49	1.09	0.88	1.14			
Gender	G1	-0.25	0.35	-0.03	-0.71	0.48	-0.95	0.45	0.88	1.13			
Treatment outcome	T1	2.62	1.25	0.09	2.09	0.04*	0.16	5.07	0.98	1.02			
Constructs	CN1 (Nurses)	3.79	0.40	0.44	9.36	0.00*	2.99	4.58	0.76	1.32			
	CD1 (Doctors)	1.61	0.42	0.18	3.83	0.00*	0.78	2.43	0.77	1.31			

Table 4.12 Parsimonious Model for overall global measures score (Y_4)

Variables for the Parsimonious Model for Y_4		**Unstandardised Coefficients**		**Standardised Coefficients**	***t***	**Sig.**	**95.0% Confidence Interval for B**		**Collinearity Statistics**		**R^2**	**Linearity**	**Overall significance of the model**
		B	Std. Error	Beta			Lower Bound	Upper Bound	Tolerance	VIF			
	(Constant)	-1.19	2.09		-0.57	0.571	-5.31	2.93			0.38	Linear based on plot *r*= 0.62	0.000*
Health status	H1	1.81	0.68	0.11	2.67	0.008*	0.48	3.14	0.97	1.03			
Nationality (Emirates)	N4	-1.40	0.35	-0.16	-4.05	0.000*	-2.07	-0.72	0.99	1.01			
Nurses	CN1	3.24	0.41	0.38	7.94	0.000*	2.44	4.04	0.72	1.40			
Doctors	CD1	1.23	0.43	0.14	2.89	0.004*	0.39	2.06	0.72	1.40			
Cleanliness	C1	0.63	0.29	0.10	2.16	0.031*	0.06	1.20	0.82	1.22			
Food Quality	F1	0.54	0.18	0.14	3.11	0.002*	0.20	0.89	0.86	1.17			

4.7.2.4.3 Calibration of the model for the Aggregated Constructs Score (Y_5)

The model building process was initiated with the specification of the initial model (see equation 4.10 below).

$$Y_5 = \beta_0 + \beta_1 A_i - \beta_2 N_4 + \beta_3 G_i - \beta_4 L_i + \beta_5 T_i + e \qquad \text{Equation 4.10}$$

Age (A_i), was not significant, while all length of stay categories (with length of stay of 1 night in the reference group) were significant (R^2 = 0.05) (Table 4.13). As experienced in the model fitting process for overall hospital rating and the global measures score, gender was not a significant predictor. Hospital treatment outcome and Nationality, particularly $N_{4,}$ were surprisingly not significant and thus were excluded from the model (Table 4.13) In order to move from the initial to a parsimonious model, other independent variables were tested and variables that were not significant (education level, marital status and number of hospital visits) were removed. Based on the Table 4.14 below, only four predictor variables - self-reported Health status (**H_1**), Length of Stay of 2-4 nights (**L_1**), Length of Stay of 5-10 nights (**L_2**) and Length of Stay of more than 10 nights (**L_3**) are significant in the model thus creating a parsimonious model.

As shown in the Table 4.14 below, the VIF (βi) was close to one signifying that there is no multicollinearity among predictor variables. The plots of the regression standardised residuals against the regression standardised predicted values for the models were randomly and evenly distributed thus indicating that the assumptions for linearity (r= 0.22) and homoscedasticity were met. The coefficient of determination (**R^2**) suggests that the following regressors explain only 5% of the total variation in the Aggregated Constructs Score.

The best- fit regression equation for the Aggregated Constructs Score may be written as:

$$Y_5 = 168.67 + 8.55H_1 - 5.13L_1 - 10.04L_2 - 13.85L_3 + \varepsilon_i \qquad \text{Equation 4.11}$$

Length of stay for more than 10 nights yielded the largest Beta-coefficient, followed by the length of stay for 5-10 nights and patient's self-reported health status. Since the R^2 is low, the variation in Y_5 cannot be explained by the length of stay and the patient's health status. As Y_5 is the aggregate of the 13 patient experience constructs, the low R^2 value may be attributed to the diverse nature of the survey constructs. Consolidating scores from heterogeneous and unrelated constructs, for instance, 'the quality of nursing care' with the 'quality of hospital food', may have resulted in great variability within the dependent variable that cannot be explained by the specified independent variables. When these constructs were analysed as dependent variables, the individual R^2 values were also low. Nevertheless, we can still draw important conclusions about the statistically significant predictors particularly in this case where we have found that the beta-coefficients have a higher negative value when the length of stay is longer. Moreover, research involving human behaviour is challenging and precise predictions (a narrow prediction interval) were not the objective of this thesis. This analysis discovered small but reliable relationships between the Aggregated constructs score (Y_5) and the patient demographics and stay characteristics. Furthermore, the results for Y_5 were an anomaly as the previously described models for Y_1 and Y_4 yielded high R^2 values.

Table 4.13 Initial model for the Aggregated Constructs Score (Y_5)

Variables for the Initial model for the Aggregated Constructs Score (Y_5)		Unstandardised Coefficients		Standardised Coefficients	t	Sig.	95.0% Confidence Interval for B		Collinearity Statistics		R Square	Linearity test	Sig.
		B	Std. Error	Beta			Lower Bound	.053	Tolerance	VIF			
	(Constant)	169.99	8.04		21.14	0.00	0.05	185.80			0.05	Linear based on plot *r*= 0.23	0.05
Nationality	N1	4.79	3.57	0.07	1.34	0.18	0.053	11.81	0.88	1.14			
	N2	1.52	3.14	0.03	0.48	0.63	0.05	7.69	0.84	1.19			
	N3	-6.47	4.70	-0.07	-1.38	0.17	-15.71	2.78	0.92	1.09			
	N4	-0.26	2.38	-0.01	-0.11	0.91	-4.94	4.43	0.80	1.26			
Age	A1	1.55	2.74	0.04	0.56	0.57	-3.85	6.94	0.54	1.84			
	A2	2.76	3.08	0.06	0.90	0.37	-3.29	8.81	0.61	1.65			
	A3	-1.19	3.39	-0.02	-0.35	0.73	-7.86	5.48	0.61	1.64			
Length of stay	L1	-5.67	2.26	-0.14	-2.51	0.01*	-10.12	-1.23	0.78	1.29			
	L2	-10.14	3.75	-0.15	-2.70	0.01*	-17.52	-2.77	0.80	1.26			
	L3	-14.02	5.48	-0.14	-2.56	0.01*	-24.79	-3.25	0.89	1.13			
Gender	G1	0.47	2.13	0.01	0.22	0.83	-3.73	4.66	0.89	1.13			
Treatment outcome	T1	5.62	7.55	0.04	0.74	0.46	-9.23	20.47	0.98	1.02			

Table 4.14 Parsimonious model for the Aggregated Constructs Score (Y_5)

Variables for the Parsimonious model for the Aggregated Constructs Score (Y_5)		**Unstandardised Coefficients**		**Standardised Coefficients**	**t**	**Sig.**	**95.0% Confidence Interval for B**		**Collinearity Statistics**		**Linearity test**	**R Square**	**Sig.**
		B	Std. Error	Beta			Lower Bound	Upper Bound	Tolerance	VIF			
	(Constant)	168.67	4.35		38.79	0.000	160.12	177.22			Linear based on plot *r*= 0.22	0.05	0.001 [a]
Health status	H1	8.55	4.12	0.11	2.08	0.038*	0.46	16.64	0.99	1.01			
Length of stay	L1 (2-4 nights)	-5.13	2.21	-0.13	-2.33	0.021*	-9.46	-0.79	0.81	1.24			
	L2 (5-10 nights)	-10.04	3.61	-0.15	-2.78	0.006*	-17.15	-2.94	0.85	1.18			
	L3 (more than 10 nights)	-13.85	5.32	-0.14	-2.60	0.010*	-24.31	-3.39	0.93	1.08			

4.7.2.5 Results of the Logistic Regression Analysis

A further analysis was performed using logistic regression to estimate the likelihood of the willingness to return (Y_1) and the willingness to recommend (Y_2). Each interval level variable was transformed into a binary outcome, with 0 reflecting 'a negative outcome' and 1 'a positive outcome'. The ratings were consolidated into a binary variable with ratings from 1-5 coded as 0 and ratings of 6-10 coded as 1. Binary variables were created this way because the frequencies were concentrated in only a few categories. The results of the analysis are expressed in terms of the maximum likelihood estimates and odds ratios (OR). Maximum likelihood estimation involves finding the value(s) of the parameter(s) that give rise to the maximum likelihood. In addition, the OR was used, as it is simpler to interpret than maximum likelihood estimates and facilitates intuitive interpretation of the results particularly when comparing one categorical explanatory variable with another. The main objective of the analysis was to fit a logistic regression model in order to test the study hypotheses and aims to:

- Validate the logistic regression model and the regression coefficients
- Interpret the most appropriate logistic regression model
- Interpret the regression coefficients

The results are shown in Tables 4.15 - 4.18 below.

4.7.2.5.1 Willingness to return to the hospital for treatment (Y_2)

The outcome measure in this analysis was willingness to return (coded as 1) and unwillingness to return (coded as 0) to test the relationship between explanatory variables specified above which included the Patient Demographics and Patient Experience Scores of the 13 constructs (refer to Table 4.4).

Using logistic regression, the objective was to test which independent variables make a significant contribution to predicting the dependent variable. That is:

Test if Ho: $\beta_o=\beta_1=\beta_2=...=\beta_j$, $j = 0, 1, 2, ...,j$ compared with Ha: $\beta_j \neq 0$ for at least one j.

First, the initial model was specified with the independent variables of various categories of Age, Care from Nurses and Care from Doctors (Table 4.15). The age factor (A_3) is significant due to patients 50 years old and above having a higher willingness to return than patients under 24 years old in the reference group. However the other age groups are not significant and thus A_1 and A_2 were pooled into the reference group. 'Care from Nurses' was also significant in the model. Care from Doctors was not significant and removed from the model. Moving towards a parsimonious model, hospital treatment outcome, health status, marital status, number of hospital visits, gender, nationality, length of stay and education level were tested and found to be not significant in the model. Of the other 11 patient experience constructs, only 'quality of hospital food' was significant. The parsimonious model of Y_2 includes the following significant variables: 'care from nurses' (CN_1), 'quality of hospital food' (F_1) and Age (A_3) (Table 4.16).

Hosmer and Lemeshow Goodness-of-Fit Test

Test if: Ho: $\pi(R) = [1+\exp(-\beta_o + \beta_2 CN_1 + \beta_2 F_1 - \beta_2 A_3)]-1$ or Ho: the model fits compared with

Ha: $\pi(R) \neq [1+\exp(-\beta_o + \beta_2 CN_1 + \beta_2 F_1 - \beta_2 A_3)]-1$ or Ha: the model does not fit

Hence it indicates the extent to which the model provides a better fit than a null model with no predictions. In order to find the overall goodness-of-fit of the parsimonious model (Table 4.16), the Hosmer and Lemeshow test was used to demonstrate that under the null hypothesis, the fitted logistic regression model is the correct model. If the Hosmer and Lemeshow statistic is greater than 0.05 then we fail to reject the null hypothesis that there is no difference between the observed and model-predicted values. Based on the Table 4.16, the model fits the observed data ($P > 0.05$, $x^2 = 4.56$). Then, the logistic regression model for willingness to return (Y_2) is a function of Age (50 years old and above), weighted average score rated for the constructs 'care from nurses', and 'quality of hospital food'.

Therefore, the logistic regression equation can be written as:

$\pi(Y_2) = [1+\exp(5.38-1.39\mathbf{A_3}+1.39\mathbf{CN_1}+0.51\ \mathbf{F_1})]-1$

Or

$$\textbf{Return } (\mathbf{Y_2}) = \frac{e^{5.38-1.39\mathbf{A3}+1.39\mathbf{CN1}+0.51\ \mathbf{F1}}}{1+e^{5.38-1.39\mathbf{A3}+1.39\mathbf{CN1}+0.51\ \mathbf{F1}}} \qquad \text{Equation 4.12}$$

Interpretation of the maximum likelihood estimates (Table 4.16):

Age3 (A_3) - This is the estimated logistic regression coefficient comparing patients who are '50 years old and above with other patients, assuming the other variables are held constant. The difference in log-odds is 1.4 units higher for patients younger than 50 years old compared those who are '50 years old and above'. Thus, patients younger than 50 years old have a higher likelihood of being willing to return to the hospital compared with older patients.

Care from Nurses (CN_1) - This is the estimated logistic regression coefficient for a one unit change in weighted average score for nursing care, assuming the other variables are held constant. If the rating were to increase the weighted average score for 'care from nurses' by one point, willingness to return is predicted to increase by 1.4 units. Thus, patients who scored nursing care higher were more willing to return to the hospital.

Quality of Hospital Food (F_1) - This is the estimated logistic regression coefficient for a one unit change in weighted average score for 'quality of hospital food'. If the rating were to increase the weighted average score for 'quality of hospital food' by one point, willingness to return is predicted to increase by 0.5 units. Thus, patients who scored the quality of hospital food' higher were more willing to return the hospital.

Interpretation with respect to odds ratio (Table 4.16):

Age3 (A_3)-patients who were less than 50 years old were 4 times more willing to return to the hospital than patients who were 50 years and older (OR 0.25), given that the other variables in the model are held constant.

Care from Nurses (CN_1) -For a one unit change in weighted average score for nurse, the odds ratio for willingness to return is expected to change by 4.01, assuming that the other variables in the model are held constant. Thus, patients who were scored 'care from nurses' higher were 4 times (OR 4.01) more willing to return to the hospital than patients who scored nurses lower.

Quality of Hospital Food (F_1)-For a one unit change in Quality of hospital food, the odds ratio for willingness to return is expected to change by 1.66, given the other variables in the model are held constant. Thus, patients who scored the quality of food higher were one and a half times (OR 1.66) more willing to return to the hospital than patients who scored hospital food lower.

Table 4.15 Initial model for logistic regression analysis for willingness to return (Y_2)

Code	Response Variables	Parameter	Analysis of Maximum Likelihood Estimates			Logistic Regression Model Validation (P-value)	Odds Ratio Estimates			Hosmer and Lemeshow Goodness-of-Fit Test (P-value)
			Estimate	**Wald Chi-Square**	**Significance (p-value)**		**Point Estimate**	**95% Wald Confidence Limits**		
Initial Model Y_2 Willingness to return to the hospital for treatment)		Intercept	-4.43	5.24	0.0220	<0.0001				0.8324
	Age	A_1	-0.32	0.14	0.7115		0.73	0.13	3.94	
		A_2	-1.26	2.24	0.1350		0.29	0.05	1.48	
		A_3	-1.93	5.44	0.0197*		0.15	0.03	0.75	
	Nurses	CN_1	1.59	19.55	<.0001 *		4.89	2.42	9.91	
	Doctors	CD_1	0.15	0.13	0.7186		1.16	0.52	2.62	

Table 4.16 Parsimonious model for logistic regression analysis for willingness to return (Y_2)

Code	Response Variables	Parameter	Analysis of Maximum Likelihood Estimates			Logistic Regression Model Validation (p-value)	Odds Ratio Estimates			Hosmer and Lemeshow Goodness-of-Fit Test (p-value)
			Estimate	**Wald Chi-Square**	**Significance (p-value)**		**Point Estimate**	**95% Wald Confidence Limits**		
Parsimonious model Y_2 (Willingness to return the hospital to their family and friends)		Intercept	-5.39	13.81	0.0002	<0.0001				0.3360 (x^2 = 4.56)
	Nurses	CN_1	1.39	18.65	<.0001		4.01	2.14	7.54	
	Age	A_3	-1.39	8.46	0.0036		0.25	0.10	0.64	
	Food Quality	F_1	0.51	7.43	0.0064		1.66	1.15	2.39	

4.7.2.5.2 Willingness to recommend to their family and friends (Y_3)

Logistic regression analysis was used to estimate the probability of willingness to recommend (Y_3). The outcome measure in this analysis, 'Willingness to recommend', was transformed into a binary outcome, with 0 reflecting 'not willing to recommend' (rating 1-5 was coded as 0) and 1 'willing to recommend' (rating 6-10 was coded as 1). The results of the analysis are expressed in terms of the odds ratios (OR) and maximum likelihood estimates with regard to their relationship with Patient Demographics and the Patient Experience Constructs (see Table 4.4).

The model building strategy consisted of first specification of the initial model with the independent variables of the various categories of Age, Care from Nurses and Care from Doctors (Table 4.17). The influence of age (A_3) is significant due to patients 50 years old and above having a higher willingness to recommend than patients under 24 years old in the reference group. However, the other age groups are not significant and thus A_1 and A_2 were pooled into the reference group. 'Care from Nurses' was also significant in the model however; 'Care from Doctors' was not significant. Moving towards a parsimonious model, hospital treatment outcome, gender, length of stay, marital status, number of hospital visits and education level were tested and found to be not significantly related to Y_3. However, the nationality effect was significant with 'other Arab countries' in the reference group but, only the Emirati nationality recorded a significantly lower willingness to recommend than other Arab countries, so all other nationalities (N_1, N_2, and N_3) were pooled in the reference group to create a reduced form model. Additionally, 'self-reported health status' was also significant. The other 11 patient experience constructs were tested and only 'quality of hospital food' was significant. Consequently, the best-fit reduced form parsimonious model contains the predictor variables, 'care from nurses' (CN_1), 'quality of hospital food' (F_1), self-reported health status (H_1), nationality (N_4) and age (A_3) (Table 4.18).

Hosmer and Lemeshow Goodness-of-Fit Test

Based on the results, H_1, N_4, A_3, CN_1, and F_1 are significant in the model (Table 4.18). Also, based on the Hosmer and Lemeshow test, the parsimonious model fits the observed data ($P > 0.05$, $x^2 = 8.58$). Then, the logistic regression model for willingness to recommend is a function of self-reported Health status, Nationality, Age, 'care from nurses' and 'Quality of Hospital Food'

Therefore, the logistic regression equation can be written as:

$\pi(Y_3)$ =[1+exp(7.74+1.49$\mathbf{H_1}$-1.23$\mathbf{N_4}$-1.75$\mathbf{A_3}$+1.72$\mathbf{CN_1}$-0.65$\mathbf{F_1}$)]-1

Or

$$\textbf{Recommend } (\mathbf{Y_3}) = \frac{e^{7.74+1.49\mathbf{H1}-1.23\mathbf{N4}-1.75\mathbf{A3}+1.72\mathbf{CN1}-0.65\mathbf{F1}}}{1+e^{7.74+1.49\mathbf{H1}-1.23\mathbf{N4}-1.75\mathbf{A3}+1.72\mathbf{CN1}-0.65\mathbf{F1}}} \qquad \text{Equation 4.13}$$

Interpretation with respect to the maximum likelihood estimates (Table 4.18):

Self-reported health status (H_1) - This is the estimated logistic regression coefficient comparing 'positive self-reported health' to 'negative self-reported health'. The difference in log-odds is expected to be 1.49 units higher for 'positive self-reported health' compared to 'negative self-reported health'. This implies that patients who rated their health as being Excellent, Very good, Good or Fair were more willing to recommend the hospital than those with a poor self-reported health rating.

Age (A_3) - This is the estimated logistic regression coefficient comparing '49 years old below' to '50 years old above'. The difference in log-odds is expected to be 1.75 units lower for '50 years old above' compared to '49 years old below', while holding the other variables constant in the model. Thus patients younger than 50 years old were more willing to recommend the hospital.

Nationality (N_4) - This is the estimated logistic regression coefficient comparing 'Emiratis' to 'other nationalities'. The difference in log-odds is expected to be 1.23 units lower for 'Emiratis' compared to 'other nationalities'. This implies that Emirati patients were less willing to recommend the hospital than patients of other nationalities.

Care from Nurses (CN_1) - This is the estimated logistic regression coefficient for a one unit change in weighted average score for the quality of nursing care. If the rating were to increase the weighted average score for nurse by one point, the difference in log-odds for willingness to recommend is expected to increase by 1.72 units, given the other variables in the model are held constant.

Quality of Hospital Food (F_1) - This is the estimated logistic regression coefficient for a one unit change in weighted average score for quality of hospital food. If the rating were to increase weighted average score for quality of hospital food by one point, the difference in log-odds for willingness to return is predicted to increase by 0.65 unit, given the other variables in the model are held constant.

Interpretation with respect to odds ratio (Table 4.18):

Self-reported Health Status (H_1) - For a one unit change in Health status, the odds ratio for willingness to recommend is predicted to change by 4.41, given the other variables in the model are held constant. Thus, patients who scored their health as 'fair to excellent' were 4 and a half times (OR 4.41) more willing to recommend the hospital than patients who had 'poor' self-reported health.

Nationality (N_4) - For a one unit change in N_4, the odds ratio for willingness to recommend is expected to change by 0.28, given the other variables in the model are held constant. Thus, patients who were Emirati nationals were 30% less willing to recommend the hospital than patients of other nationalities.

Age (A_3)-For a one unit change in A_3, the odds ratio for willingness to recommend is predicted to change by 0.17, given the other variables in the model are held constant. Therefore, patients younger than 50 years old were 6 times more willing to recommend the hospital than patients who were 50 years and older.

Care from Nurses(CN_1) -For a one unit change in weighted average score for Care from Nurses, the odds ratio for willingness to recommend is expected to change by 5.58, given the other variables in the model are held constant. Hence, patients who scored nursing care higher were five and a half times more willing to recommend the hospital than patients who rated nurses lower.

Quality of Hospital Food(F_1) -For a one unit change in weighted average score for 'quality of food', the odds ratio for willingness to recommend is predicted to change by 1.92, given the other variables in the model are held constant. Thus, patients who scored 'quality of hospital food' higher were approximately twice as willing to recommend the hospital as those who rated 'quality of hospital food' lower.

Table 4.17 Initial model for Willingness to recommend (Y_3)

Code	Response Variables	Parameter	Analysis of Maximum Likelihood Estimates			Logistic Regression Model Validation (p-value)	Odds Ratio Estimates			Hosmer and Lemeshow Goodness-of-Fit Test (p-value)
			Estimate	**Wald Chi-Square**	**Significance (p-value)**		**Point Estimate**	**95% Wald Confidence Limits**		
Initial Model Y_3 (Willingness to recommend the hospital to their family and friends)		Intercept	-5.72	6.53	0.0106	<0.0001				0.4070 $x^2 = 8.58$
	Age	A_1	-0.74	0.40	0.5290		0.48	0.049	4.72	
		A_2	-1.86	2.68	0.1019		0.16	0.017	1.44	
		A_3	-2.57	5.24	0.0221*		0.08	0.009	0.69	
	Nurses	CN_1	1.92	22.01	<.0001*		6.79	3.049	15.10	
	Doctors	CD_1	0.28	0.39	0.5328		1.32	0.549	3.19	

Table 4.18 Parsimonious model for Willingness to recommend (Y_3)

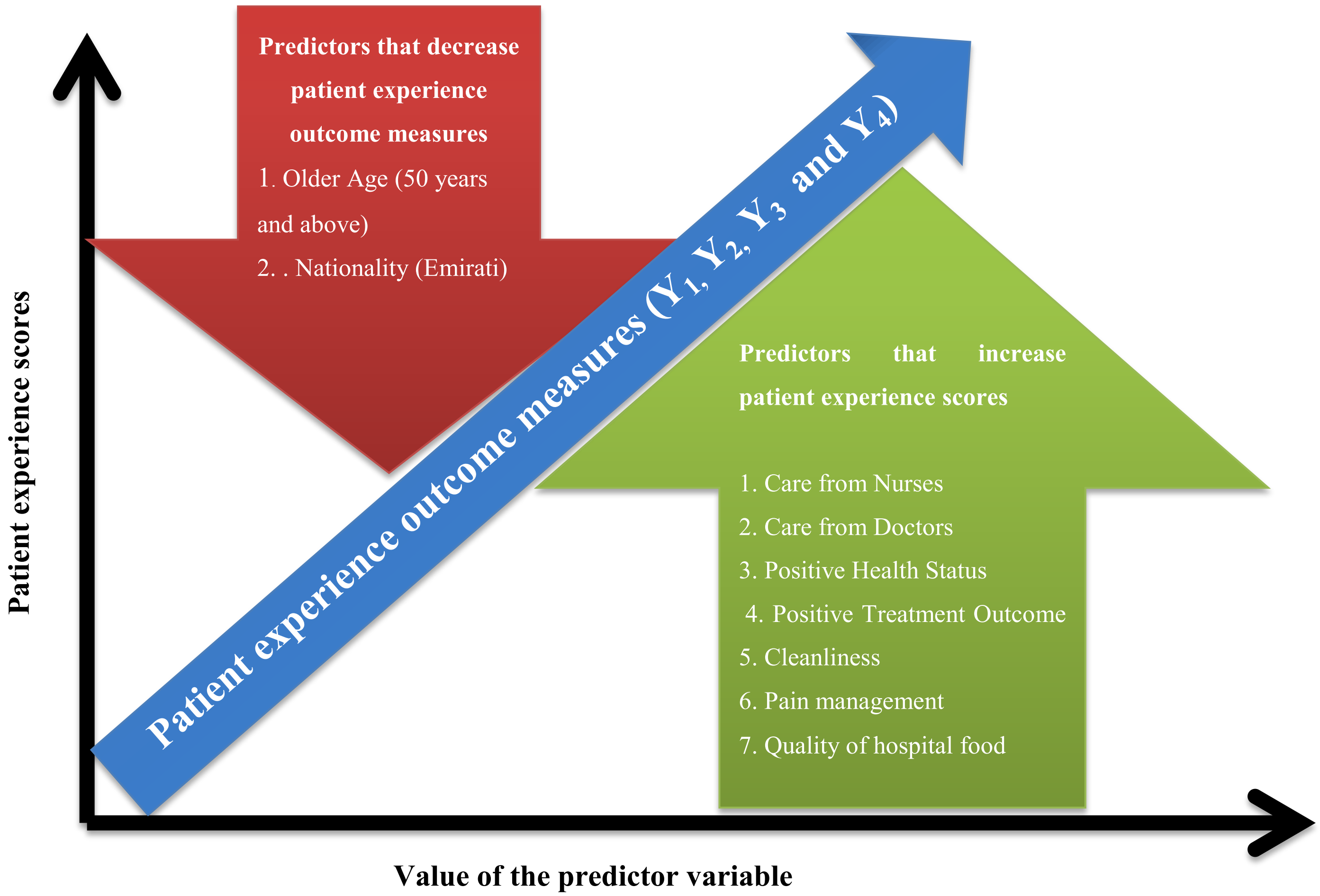
Code	Response Variables	Parameter	Analysis of Maximum Likelihood Estimates			Logistic Regression Model Validation (p-value)	Odds Ratio Estimates			Hosmer and Lemeshow Goodness-of-Fit Test (p-value)
			Estimate	**Wald Chi-Square**	**Significance (p-value)**		**Point Estimate**	**95% Wald Confidence Limits**		
Parsimonious model Y_3 (Willingness to recommend the hospital for treatment)		Intercept	-7.75	19.76	<.0001	<0.0001				0.1986
	Health status	H_1	1.49	4.55	0.0329		4.42	1.13	17.30	
	Nurses	CN_1	1.72	21.52	<.0001		5.58	2.70	11.54	
	Age (50y and above)	A_3	-1.75	9.34	0.0022		0.17	0.06	0.53	
	Nationality (Emirates)	N_4	-1.28	5.07	0.0244		0.28	0.09	0.85	
	Food Quality	F_1	0.65	9.17	0.0025		1.92	1.26	2.94	

Table 4.19 Summary table of the results of the regression analysis

<table>
<tr><th rowspan="2">Predictor Variables</th><th colspan="5">Dependent variables</th></tr>
<tr><th>Overall rating (Y_1)</th><th>Willingness to return (Y_2)</th><th>Willingness to recommend (Y_3)</th><th>Overall global measure score (Y_4)</th><th>Aggregated constructs score (Y_5)</th></tr>
<tr><td>Age</td><td>No</td><td colspan="2">Age3: Patients younger than 50 years old were more willing to return and recommend the hospital than patients who were 50 years and older</td><td>No</td><td>No</td></tr>
<tr><td>Care from Nurses</td><td colspan="4">Patients who scored nursing care higher had higher overall hospital ratings, were more willing to return to the hospital, were more willing to recommend the hospital and had a higher global measure score</td><td>No</td></tr>
<tr><td>Care from Doctors</td><td>Patients who scored care from doctors higher had a higher overall hospital ratings</td><td>No</td><td>No</td><td>Patients who scored care from doctors higher had a higher global measure score</td><td>No</td></tr>
<tr><td>Nationality</td><td>Nationality4- Emirati patients gave lower overall hospital ratings other nationalities.</td><td>No</td><td colspan="2">Nationality4- Emirati patients were less willing to recommend the hospital and had a lower global measure score than patients of other nationalities.</td><td>No</td></tr>
<tr><td>Hospital treatment outcome</td><td>Patients with a positive Treatment outcome rated the hospital higher</td><td>No</td><td>No</td><td>No</td><td>No</td></tr>
<tr><td>Health status</td><td>No</td><td>No</td><td colspan="2">Patients who rated their health as higher were more willing to recommend the hospital</td><td>The overall health status was significant but the R^2 was low at 0.05</td></tr>
<tr><td>Quality of hospital food</td><td>No</td><td colspan="3">Patients who scored food quality higher were more willing to return the hospital, more willing to recommend the hospital and had a higher global measure score</td><td>No</td></tr>
<tr><td>Pain management</td><td>Patients who scored pain management higher had an overall</td><td>No</td><td>No</td><td>No</td><td>No</td></tr>
</table>

	hospital rating				
Cleanliness	Patients who scored cleanliness higher had a higher overall hospital rating	No	No	Patients who scored cleanliness higher had a higher overall global measures score	No
Length of stay	No	No	No	No	$\mathbf{L_1}$, $\mathbf{L_2}$ and $\mathbf{L_3}$ were significant but the R2 was low at 0.05

Figure 4.1 Conceptual map of the predictors of patient experience



4.8 Discussion of the overall results

A total of 391 patients were interviewed for the patient experience survey. The descriptive analysis of the patient demographics revealed that the majority of patients interviewed were within the ages of 25-34 years old, had undergraduate degrees, were Emirati nationals, were married, stayed in the hospital for 2-4 nights, visited the hospital 2-4 times and were predominantly female. The descriptive analysis of results demonstrates that 35% of patients rated the hospital 10 out of 10 for the overall care. More than 50% of the patients interviewed stated that they will 'definitely' (10/10) return to the hospital and will 'definitely' (10/10) recommend this hospital to their family and friends.

Patients ranked the domain of 'care from doctors' as most important followed by 'care from nurses', 'treatment with respect and dignity', 'cleanliness of the hospital and hand-washing,' consistency and coordination of care' and 'pain management'. Figures 4.1 conceptualises the results of the regression analysis regarding the predictors and their influence (either positive or negative) on the five patient experience outcome measures. The paragraphs below explain these predictors in detail.

4.8.1 Patient demographics

4.8.1.1 Age group

H_0: There is no relationship between the age of a patient and their patient experience scores.

H1: There is a positive relationship between the age of a patient and their patient experience scores.

We have rejected the null hypothesis and state that there is an inverse relationship between age and willingness to return (Y_2) and willingness to recommend (Y_3). The largest effects on ratings of experience were associated with age, although this varied between domains, being greatest for the 'willingness to return' (Y_2) and 'willingness to recommend' (Y_3) domains. Patients who were 50 years old and above had lower willingness to recommend the hospital (Y_2) and willingness to return to the hospital if needed (Y_3) than patients who were 49 years old and younger. Bleith *et al.* (2007) regarded age as a key indicator of expectations, and this may well underpin some of the differences in experience reported here.

Our findings contradict previous patient satisfaction research that suggests elderly patients tend to report higher satisfaction with their care than younger patients (Hall *et al*., 1990; Tehrani *et al*., 2011). However these investigations may be subject to respondent bias as they used internet- based surveys and the self-reported data that are subject to respondent recall bias and may have affected the survey responses, particularly from the elderly group. Similarly Nguyen *et al.* have reported that older people tend to be more satisfied with care than do younger people (Nguyen *et al*., 2002). A randomised survey of 8428 patients from 39 hospitals (Schoenfelder *et al*., 2011) proved that patients' age was related to level of satisfaction ($P \leq 0.001$) with older patients being more satisfied than younger patients. It has previously been shown in other examinations that a significant part of the variation in global patient satisfaction can be related to age (Rahmqvist, 2004) with older patients being more satisfied (Sun *et al*., 2000; Young *et al*., 2000; Crow, *et al*. 2002; Jaipaul and Rosenthal, 2003). It is important to note that these studies used patient satisfaction as a dependent variable and not patient experience.

Many other examinations have found that younger patients are less satisfied than older almost regardless of culture, country or the type of health-care organisation; for example, in Saudi Arabia (Saeed *et al*. 2001), Norway (Brekke, 2001) or the USA (Sun *et al*., 2000; Young *et al*., 2000). The differences between these studies and the findings above could be explained, in part, by the demographic dissimilarities. The UAE has a larger, younger educated immigrant population who need to be employed in order to live in the UAE while the smaller older population is largely Emirati. Another possible reason for the lower patient experience rating of older study participants could be that older patients may be treated differently and have more complex medical conditions, resulting in more interventions and a longer length of stay. The study being set in an acute care hospital may also have affected the ratings, as the hospital may not be equipped to deal with complex and chronic conditions of older patients.

4.8.1.2 Nationality

H_0: There is no relationship between the nationality of a patient and their patient experience scores.
H2: There is a relationship between the nationality of a patient and their patient experience scores.

It is hypothesised that the indigenous population (Emirati) will have higher expectations of care than the expatriate population because of free healthcare and their ability to travel abroad for healthcare services. In terms of nationality, the inferential statistics implied that Emirati nationals had a significantly higher propensity to provide lower overall hospital ratings. Furthermore, Emirati nationals had significantly lower willingness to recommend the hospital than nationals from other countries, consequently demonstrating that Emirati nationals (the local population) are significantly more discriminating than patients from other Arab countries, Western, African and Asian countries. Thus, the null hypothesis is rejected and the alternative hypothesis is accepted.

The relationship between patient evaluations of care and nationality has been unclear from different investigations. However our findings are consistent with other investigations where expatriates from different countries showed a higher satisfaction rating when compared to nationals (Al-Shamekh, 1992; Abd Al Kareem *et al.*, 1996; Al-Faris *et al.*, 1996; Makhdoom *et al.*, 1997; Bo Hamra and Al-Zaid, 1999; Saeed *et al.*, 2001). In contrast, two surveys found no significant difference between Saudis and non-Saudis in terms of satisfaction (Mansour and Al-Osimy, 1993; Al-Doghaither and Saeed, 2000). A Kuwaiti investigation showed that Non-Kuwaitis had lower satisfaction rates than Kuwaiti nationals (Alhashem, 2009). However this investigation excluded the private sector and did not validate the survey tool locally. As healthcare is free for Kuwaitis, the experience of non-Kuwaitis may have been influenced by the payment requirements. Again, the above literature only relates to patient satisfaction and not patient experience.

4.8.1.3 Education

H_0: There is no relationship between the education level of a patient and their patient experience scores.
H3: There is a relationship between the education level of a patient and their patient experience scores.

It is hypothesised that the patients with higher education levels will be more discriminating that those with lower education levels and thus have lower experience scores. Patients with higher education levels may have better access to health information and thus have higher expectations of care. The study results, however, prove that there was no significant relationship between the education level and overall hospital rating, willingness to return and willingness to recommend. Although, educational level had no impact on patient experience scores in our study, investigations from Saudi Arabia, however, indicated that the more educated the patients were, the more likely they were to be satisfied (Saeed, 2001; Alaiban, 2003). It is important to note that these investigations (Saeed, 2001; Alaiban, 2003) made use of bivariate statistics predominantly and the above are merely associations and not causal relationships.

4.8.1.4 Gender

H_0: There is no relationship between the gender of a patient and their patient experience scores.
H4: There is a relationship between the gender of a patient and their patient experience scores.

Previous research results show similar satisfaction scores among men and women (Sack *et al*., 2011 and Garcia-Aguilar *et al*., 2000). These findings are inconsistent with the findings of patient satisfaction research in the Middle East that demonstrated that males were significantly more satisfied than females (Al-Sakkak and Al- Nowaiser, 2008; Abdul Kareem *et al*., 1996; Al-Eisa and Al-Mutar, 2005). In line with the Middle Eastern research reports, it was hypothesised that women are more demanding of the quality of care, including nursing care, and would record lower experience scores than males. However our results prove that there is no significant difference between the gender categories and overall hospital rating, willingness to return and willingness to recommend. Thus, we accept the null hypothesis.

4.8.1.5 Patient's self-reported health status

This research demonstrated that patients who scored their health as 'fair to excellent' were 4 times (OR 4.14) more willing to recommend the hospital than patients who had poor self-reported health. Furthermore, patients with a positive self-reported health status (health rated as excellent to fair) had a higher Aggregated constructs score.

These findings are consistent with a number of research papers where patients' positive self-perception of health is related to a higher level of satisfaction. Hall *et al*. (2001) established that patient's self-perceived overall health status predicts the level of patient satisfaction. A positive relationship between patients' perception of their health and their satisfaction with health services exists according to Weiss (1988). Linn *et al*. (1984) determined that patients' perception of their health status, both physically and emotionally, has a significant effect on their rating of their doctors' behaviour. Similarly, Rahmqvist (2001) argued that poor health and pain correlate negatively with patient satisfaction. Penchansky and Thomas (1981) concluded that patients who perceived their health status to be low and had more concerns about their health tended to be less satisfied than others. Similarly, Patrick *et al.* (1983) found that patients who rated themselves to have 'fair-poor' health were significantly more likely to be dissatisfied with their doctors. While many of the above research papers were unable to establish a causal link between self-reported health status and the patient's evaluation of care, Hall *et al*. (1993), using a longitudinal design, demonstrated a unidirectional causal relationship between the self-reported health status and the patient's satisfaction rating. The failure to exclude the possibility of the physicians influence on patient satisfaction was a weakness of the longitudinal investigation.

4.8.2 Hospital stay characteristics

4.8.2.1 Length of stay (LOS)

Although, LOS was identified as a predictor variable for the Aggregated constructs score (Y_5), analysis revealed that the R^2 was low. Limited studies have been published on the relationship between LOS and patient satisfaction for a specific diagnosis or treatment. These studies show that a reduced LOS does not adversely affect patient satisfaction (Siebens *et al*., 2010; Litwin, *et al*., 1997; Kirsh *et al*., 2007; Finkelstein *et al*., 1998; Lorish *et al*., 1998). Carmel (1985) reported a significant correlation between patients with a long LOS and their satisfaction with surgical ward nurses. Rosenheck *et al*. (1997) also found a positive relationship between LOS and patient satisfaction among psychiatric patients. Other examinations showed no clear relationship between LOS and patient satisfaction (Haraden, 2004; Hall and Dornan, 1990; Cleary *et al*., 1989). A recent Dutch survey also found no correlation between LOS and patient satisfaction in six out of seven specialties (Borghans *et al.*, 2012). However this survey was limited as the LOS analysis was carried out at the ward level and not the individual patient level.

4.8.2.2 Hospital Treatment Outcome

A positive hospital treatment outcome was identified as a predictor variable for the overall hospital rating. Analysis revealed that patients who had a positive treatment outcome were more likely to provide a higher overall hospital rating than patients with negative treatment outcomes. The author is unaware of any research that either supports or refutes this finding. This may be an area of originality warranting further research.

4.8.3 Patient experience constructs

4.8.3.1 Care from Nurses

This research results reveals that the construct for ‘care from nurses’ was a predictor of the overall rating of the hospital (1-10), the global measures score, willingness to return and willingness to recommend. Furthermore, these results are consistent with our findings where the patients had ranked this construct as being number two in terms of importance. Other research papers support our findings and report that nurses are considered to play an important role in direct patient care, and thus interaction with nurses is the main determinant of patient satisfaction (Larrabee *et al*., 2004; Thorsteinsson, 2002). Various reasons have been posited for the relationship between nursing care and patient satisfaction, including the amount of time and interaction these nurses spend with inpatient care (Wolosin *et al*., 2012). Correlations of patients' overall satisfaction with their hospital stay and their willingness to recommend the hospital (Abramowitz *et al*., 1987) has also been documented in the literature. Schmidt (2004), demonstrated that patients' experiences with nursing care was directly associated with the patients' perceptions of quality of care. The literature is abounds with studies supporting nursing care as the predominant attribute to patients' rating of excellent experiences (Otani and Kurz, 2004; Otani *et al*., 2009; Otani *et al*., 2010). Higher nursing levels lead to frequent nurse rounding, which has been associated with improved patient safety and satisfaction (Gardner, 2009; Cann and Gardner, 2012).

4.8.3.2 Care from Doctors

The thesis results reveal that the construct for 'care from doctors' was a predictor of the overall rating of the hospital (Y_1) and the global measures score (Y_4). Furthermore, these results are consistent with our findings that the patient's had ranked 'care from doctors' as being of primary importance which, in turn is consistent with our literature review on patient satisfaction. It has long been established that the doctor-patient relationship has an impact on patient satisfaction with most research papers published at least a decade ago. In contrast, we have found minimal research on the doctor-patient relationship and its impact on patient experience scores, largely due to the recent development of patient experience surveys. Chen *et al*. (2001), demonstrated that patient perception of the time spent with their physician is strongly associated with overall satisfaction. Overall patient satisfaction is also influenced by receiving information from medical staff (Crow *et al*., 2002; Hall and Dornan, 1990 and Thompson, 1996). The quality of the doctor-patient relationship is central to patients' perception of the care they receive (William *et al.*, 1998). Studies support how physicians can influence satisfaction ratings by creating a rapport with the patient and permitting sufficient time for explanation (Daniel *et. al*, 1999; Gross *et. al*., 1998; Young *et al*., 1998; Sixma *et al*., 1998; Whitworth *et al*., 1999). While patients may not be able to reliably judge the accuracy of a diagnosis or treatment plan, they can evaluate whether the information given to them about their condition was sufficient. Patients are able to assess the disposition and attitudes of their physicians. These factors can be managed by the medical staff, thus permitting an opportunity to improve on patient's evaluation of the care provided by physicians (Lis *et al*., 2009).

4.8.3.3 Cleanliness

Our analysis has shown that the construct for 'cleanliness' was a predictor of the overall rating of the hospital (Y_1) and the global measures score (Y_4). Furthermore, these results are consistent with our findings that patients had ranked the 'cleanliness' construct as being number four in terms of perceived importance. The author is not aware of any published literature with similar findings.

4.8.3.4 Pain Management

The results reveal that the construct 'pain management' is a predictor of the overall rating of the hospital (Y_1). Furthermore, these results are consistent with our finding that patients ranked the 'pain management' construct as being number six in terms of importance. While there is a dearth of investigations on pain management, our findings are inconsistent with Kelly who evaluated 54 patients and found no correlation between satisfaction and the change in pain scores (Kelly, 2000). His evaluation is fraught with methodological weaknesses including the small sample size and use of bivariate statistics only. It is only in a recent investigation that pain management was recognised as a significant aspect of high-quality care and an integral component of patient satisfaction. The investigation showed that patients were more likely to rate their overall satisfaction highly if they perceived that their care providers were doing everything they could to help control their pain and if their pain was well controlled (Hanna *et al*., 2012). JCI's pain management standards state that every patient has a right to have his or her pain assessed and treated (JCI, 2010). With limited literature on this relationship, the area is under researched and thus requires further empirical enquiry.

4.8.3.5 Quality of Hospital Food

The study results revealed that the construct for 'quality of hospital food' was a predictor of willingness to recommend (Y_3), willingness to return (Y_2) and the global measures score (Y_4). The author is not aware of any research that is consistent with our findings on this relationship with patient experience. This could be an area of originality requiring further research. In addition, this is a service quality component and may be particularly unique to the Emirates and its population.

4.9 Conclusion

Patient evaluations of care are important for continuous quality monitoring and improvement of all systems of healthcare delivery. This feedback alerts managers to patients' needs and concerns, identifies service gaps, and permits the assessment of improvements as they are implemented. Patient experience surveys encourage staff accountability for the quality of service they deliver. They provide organisational incentives for improvement and a mechanism for staff performance rewards. Patient experience is a fundamental concern to healthcare managers who need to maintain or increase their market share. In healthcare systems, like the UAE, where patients can choose their providers, poor performance and poor quality of care may result in patients going elsewhere which, on a large scale would result in a significant loss of revenue (Strasser and Davis, 1991). Due to fierce industry competition in healthcare today, patient experience is a high priority for healthcare leaders internationally (Lee, 2005). We set out with objectives to present a standardised method for collection, analysis and use of patient experience data for quality improvement and care delivery. In addition, the thesis identified the determinants of positive patient experience at the patient and hospital levels. Through the above analysis, approaches to achieving fair and transparent assessments of hospitals for internal and/or external benchmarking and, suggestion of methods for using patient experience data to identify areas for improvement, were proposed.

The analysis of the patient experience data reveals a number of predictors. The strongest construct predictors were 'care from nurses' followed by 'care from doctors' and 'pain management in the hospital'. In terms of patient demographics, the strongest predictors were nationality (Emirate vs. non-emirati), age (50 years and above vs. 49 and below), and self-reported health. Significant patient stay characteristics include the hospital treatment outcome. Constructs such as 'treatment with respect and dignity', consistency and coordination of care' and 'patient rights and feedback' were not significant predictors, although patients ranked these aspects as highly important in their hospital experience. These results may suggest that the patients' lack of medical knowledge could have been influential, resulting in patients not being able to judge the above technical domains of performance. This explains in part the influence of the two service constructs, 'quality of food' and 'cleanliness' on the global measure score and overall rating of the hospital as patients may have looked for surrogate indicators of above constructs to measure their own experience.

Although causality cannot be inferred based only on a single case study due to the complexity of human nature, the multiple linear regression and logistic regression models suggests important relationships between the variables which merit further investigation. Additionally, the results concur with the findings of several previous research papers using different survey methodologies on patient satisfaction, namely, that of the patient factors, patients' self-reported health and age (Hall and Dornan, 1990; Jaipaul and Rosenthal, 2003; Rahmqvist, 2001; Hargraves, *et al*. 2001; Hekkert, *et al*., 2009) and to a lesser extent education (Rahmqvist, 2001; Hargraves, *et al*. 2001; Hekkert, *et al.*, 2009) are the strongest predictors influencing patient satisfaction scores. Furthermore, patients who are satisfied with their nursing care are more likely to follow treatment and, consequently, to have better health outcomes (Sitzia and Wood, 1997; Wagner and Bear, 2009). It is important to note that all of the above investigations have used patient satisfaction. There is a dearth of investigations into the predictors of patient experience. However, in the absence of such work, the researcher has compared the satisfaction investigations to this study for the purposes of analysis of trends in the literature.

In part, the thesis findings relating to demographic factors are supported by previous research in the area of patient satisfaction. This thesis adds the additional dimension of both demographic and patient experience factors that influence the overall rating of the hospital, willingness to return and willingness to recommend. Previous examinations using the above variables have been documented in the literature, but to the best of the author's knowledge, the full range of variables included in this thesis had not been analysed together using multivariate analyses for the different domains of a validated patient experience questionnaire. Predictors that are under-researched include service quality aspects such as 'cleanliness' and 'food', and other predictors such as 'pain management' and 'hospital treatment outcome'. Future investigations on patient experience should focus on these predictors. Furthermore, this is the first project on patient experience in the Middle East and brings to light the influence of nationality on patient experience evaluations. Our findings highlight how crucial it is for healthcare organisations to provide culturally and age appropriate healthcare services. Understanding the predictors of positive patient experience between diverse age and national groups will allow healthcare organisations to provide care that is designed to meet the unique needs of the patient population in the Middle East. This will include acquiring additional knowledge of healthcare-related beliefs, attitudes around wellness, communication patterns with providers of different national and age groups in order to improve services and treatment programs. Understanding these non-policy predictors of patient experience should be borne in mind when interpreting the results of patient experience surveys.

The strength of this thesis is that it focuses on a variety of wards and specialties in contrast to the literature where most examinations of the association between patient experience and quality have been on specific specialties/wards. This micro level analysis is valuable for local policy measures or addressing disease specific issues. However the researcher believes that a comprehensive evaluation on the fundamental predictors of positive patient experience is needed if patient surveys are to become a proficient national policy-making mechanism. Our results provide an overall and generalised picture of the patient experience in a UAE-based multi-specialty hospital setting. We have thus been able to identify a set of patient socio-demographic characteristics and patient experience constructs that are associated with patient experience rating of inpatient hospital care. Although, the demographic predictors are unalterable, they will allow healthcare organisations to identify patient populations at risk of poor experiences. The influence of the patient experience constructs as important predictors of patient experience, in comparison to patient demographics and stay characteristics, adds further value for quality improvement. These variables are alterable and therefore can be utilised by health providers to improve service quality, quality of care and subsequently patient experience. Further research, including larger data sets or even national data from the UAE or other Middle Eastern countries, may serve to validate the findings of this thesis.

4.10 Policy implications

As patient expectations continue to shift, questions remain: what do patients want and how can healthcare organisations deliver it? Patient experience surveys measure what patients' value. Research demonstrates that patients prioritise provider-patient relationship as key elements of quality (Robert Wood Johnson Foundation, 2007). Unlike patient satisfaction surveys that obtain ratings of satisfaction with care, patient experience surveys ask patients to report on their actual experiences in performance dimensions that patients value. Experience data are concrete and actionable in contrast to general satisfaction scores.

At the organisational level, the predictor variables (five patient experience constructs) can be readily acted upon and incorporated in a hospital's strategic stance. For example, the findings of this study suggest that patients accord great importance to the 'care from nurses' and 'care from doctors'. Therefore, if hospital management wants to ensure good patient experience, they could periodically track staff performance in these areas. By tracking these ratings, supervisors can detect significant variations over time. Consistent low performance will allow management to identify staff behaviours and take appropriate action such as increasing training and modifying staffing ratios to improve timeliness, communication and time spent. The service quality aspects like 'cleanliness' and 'quality of hospital food' are also associated with patient experience. Clearly, these aspects can be remedied by the organisation so that negative impressions are not conveyed. In addition, the identification of demographic predictors would allow healthcare managers to create programmes to improve quality of care with different foci targeting specific patient groups as opposed to a generalised systematic patient programme.

At a national or regulatory level, a standardised patient experience tool allows for comparison to national benchmarks, unlike subjective satisfaction data. We have shown that patient and stay characteristics especially age, nationality, patient reported health status and treatment outcome have a substantial impact on the patient experience outcome measures. This suggests that experience surveys can be adjusted for case-mix, which refers to the type or mix of patients seen at a hospital. This is fundamental, as case mix corrections can assist regulatory and external bodies to objectively benchmark between hospitals and report these publicly. Furthermore, public reporting of performance raises provider awareness of quality gaps and compels efforts for improvement. Providing patients with access to patient experience information empowers them to evaluate healthcare providers on aspects of care that they value. Such findings as the identification of demographic predictors have important implications for restructuring health insurance plans to meet patient needs and preferences more effectively.

Good patient experience has a well-documented relationship with clinical quality (Sequist *et al*., 2008). Patients with better experiences are more engaged and comply better with treatment regimes (DiMatteo, 1994). Safran performed a cross-sectional observational evaluation of 7,204 adults looking at the relationship between the physician's comprehensive 'whole person' knowledge of patients and patients trust in the physician (Safran *et al*., 1998). A comparison of the highly rated physician services (95th compared to 5th percentile) demonstrated improved adherence to the treatment regimen (44 vs. 17 percent, $P \leq 0.001$), as well as a remarkable improvement in patient satisfaction (87.5 vs. 0.4, $P \leq 0.001$). This is particularly pertinent for chronic patients, as healthcare providers cannot achieve beneficial treatment outcomes without patient commitment and compliance. Thus, positive patient experiences correlate with improved clinical outcomes (Stewart, 1995; Glickman, *et. al*, 2010). In addition, measuring patient experience identifies quality issues at both an individual level and system level. The information gained can reveal actionable system level problems such as bottlenecks that cause delays in processes (e.g. admission) and communication gaps that affect efficiency (Sequist *et al*., 2008). Because patient experience has become a core element of quality, regulators and payers are frequently using it as a financial incentive (US Department of Health and Human Services, 2008; Geiger, 2012). The literature has also proven that positive patient experience lowers medical malpractice risks (Hickson *et al*., 1994). Poor patient experiences cause patients to vote with their feet: Keating performed an analysis of 2,000 patients and found that 12 percent considered changing primary care physicians due to 'poor communication' (Keating *et al.*, 2002). Improving patient experience has even been linked to a quality- centred culture and lower staff turnover (Stephen, 2005). Patient experience has become a business imperative that drives referrals, volume, and revenue as much as clinical quality. Therefore, measuring and improving patient experience has across-the-board benefits particularly in an international healthcare landscape with rising costs, fierce competition, public reporting, malpractice risks and an ardent focus on quality.

However, patient experience is a new field of enquiry evolving from patient satisfaction. To add to complexity, positive patient experience is the responsibility of all staff in the organisation, but if it is everybody's job, then it is nobody's job. Organisations are now creating structures and portfolios for sustaining improvements in patient experience. Patient experience departments and even chief experience officers are some of the structures that have been created to meet the needs of this important component of healthcare. Various improvement efforts and innovations in patient care have emerged to enhance patient experience. However, none of the above initiatives would add value if the patient experience survey tool and data are unreliable or inaccurate.

In summary, this thesis has not only succeeded in developing and administering a valid and reliable survey tool for the UAE, but also produced findings that make important contributions to the knowledge base on patient experience in the UAE as well as policy implications that could lead to improvements in clinical quality. Our findings yield new insights into the sources of variation in patient experience ratings that are unique to the Middle East which could set a precedent to benchmarking activities and other related regulatory changes in Abu Dhabi and possibly the UAE. Most importantly, at both an organisational level and national level, the findings can be used to beneficially impact on the patient thus inspiring the patient-centred philosophy of care. This research has involved a journey from theory into practice; the results are well defined, comprehensible, actionable and within the scope of those who would gain most from it.

The patient experience case study in this chapter identified the predictor variables of patient experience. The next chapter details the results of the cross-sectional analysis of 27 Abu Dhabi hospitals. The objective of this analysis is to examine the impact and correlation of accreditation with patient experience. This includes an evaluation of the association of the hospital level variables with patient experience scores. The findings will develop our understanding of the relationship between accreditation and patient experience thus building on the knowledge gained in this chapter on patient experience and will further delineate the influence of patient demographics, stay characteristics and survey constructs on patient experience scores.

4.11 APPENDIX

Appendix 4.A Survey Statistics

Item Description	Value
Number of completed surveys	391
Number of surveys administered	391
Response Rate	100.00%

Appendix 4.B Distribution of Respondents rating of Overall Health on the day of discharge

Overall Health Rate	N	%
Poor	5	1.28%
Fair	19	4.86%
Good	107	27.37%
Very Good	149	38.11%
Excellent	111	28.39%
Grand Total	391	100.00%

Appendix 4.C Distribution of Respondents/Patients by Level of Education

Level of Education	N	%
8th Grade or Less	48	12.28%
Some high school, but did not graduate	27	6.91%
High School Graduate	112	28.64%
Undergraduate Degree	143	36.57%
Postgraduate degree	61	15.60%
Grand Total	391	100.00%

Appendix 4.D Distribution of Respondents/Patients by Nationality

Geographical region	Nationality	N	% Share
Africa	Algeria	2	0.51%
	Ethiopia	1	0.26%
	Morocco	8	2.05%
	Nigeria	1	0.26%
	Somalia	4	1.02%
	South Africa	5	1.28%
	Sudan	14	3.58%
	Tunisia	1	0.26%
	Zimbabwe	2	0.51%
Africa Total		**38**	**9.72%**
Arab Country	Egypt	52	13.30%
	Iran	1	0.26%
	Iraq	2	0.51%
	Jordan	22	5.63%
	Lebanon	3	0.77%
	Oman	4	1.02%
	Palestine	20	5.12%
	Sudan	1	0.26%
	Syria	27	6.91%
	Yemen	21	5.37%
Arab Country Total		**153**	**39.13%**
Asian Country	Afghanistan	1	0.26%
	Bangladesh	3	0.77%
	India	17	4.35%
	Indonesia	1	0.26%
	Pakistan	18	4.60%
	Philippines	13	3.32%
	Sri Lanka	1	0.26%
Asian Country Total		**54**	**13.81%**
Emirates	Emirates	126	32.23%
Emirates Total		**126**	**32.23%**

Western Country	Australia	3	0.77%
	Britain	7	1.79%
	Canada	2	0.51%
	France	1	0.26%
	Germany	1	0.26%
	Guatemala	1	0.26%
	New Zealand	1	0.26%
	Portugal	1	0.26%
	Spain	1	0.26%
	USA	2	0.51%
Western Country Total		**20**	**5.12%**
Grand Total		**391**	**100.00%**

Appendix 4.E Distribution of Respondents/Patients by Age

Age	N	%
Under 18 years	39	9.97%
18-24 years	41	10.49%
25-34 years	158	40.41%
35-49 years	87	22.25%
50-64 years	40	10.23%
65-79 years	20	5.12%
80 above	6	1.53%
Grand Total	391	100.00%

Appendix 4.F Distribution of Respondents/Patients by Marital Status

Marital Status	N	%
Married	302	77.24%
Divorced	8	2.05%
Widowed	9	2.30%
Never Married	72	18.41%
Grand Total	391	100.00%

Appendix 4.G Distribution of Respondents/Patients by Length of Stay

Length of Stay	N	%
1 night	124	31.71%
2-4 nights	214	54.73%
5-10 nights	38	9.72%
More than 10 nights	15	3.84%
Grand Total	391	100.00%

Appendix 4.H How many hospital visits have you had in the past year?

Number of Hospital Visits in the past year	N	%
Less than 2 visits	108	27.62%
2-4 visits	131	33.50%
5-8 visits	62	15.86%
9-10 visits	38	9.72%
More than 12 visits	52	13.30%
Grand Total	391	100.00%

Appendix 4.I Distribution of Respondents/Patients by Gender

Gender	N	%
Male	164	41.94%
Female	227	58.06%
Grand Total	391	100.00%

The majority were female respondents (58.06%) as the hospital has a busy maternity service.

Appendix 4.J How much did the hospital treatment/operation improve your health problem?

Health Status After Treatment	N	%
Worse than before	2	0.51%
Not at all	5	1.28%
Somewhat	42	10.74%
Quite a bit	112	28.64%
A Great deal	230	58.82%
Grand Total	391	100.00%

Appendix 4.K Frequency distribution of survey responses by item

Construct	Item Description	Code	Percentage Response				
			Never	Seldom	Half of the Time	Most of the Time	Always
Your Care from Nurses	1. Did the nurses treat you with courtesy and respect?	CFN1	0.51%	0.51%	1.54%	7.20%	90.23%
	2. Did the nurses listen carefully to you?	CFN2	0.00%	0.52%	2.07%	9.04%	88.37%
	3. Did the nurses explain things in a way you could understand?	CFN3	1.03%	0.77%	5.15%	10.82%	82.22%
	4. Were there sufficient nurses on duty to care for you in hospital?	CFN4	1.80%	1.54%	4.63%	11.83%	80.21%
	5. Did the nursing staff respond immediately to your call bell?	CFN5	1.56%	1.30%	8.05%	19.74%	69.35%
	6. Did you have confidence and trust in the nurses treating you?	CFN6	0.00%	0.52%	4.39%	15.76%	79.33%
	7. Did the nurses talk in front of you as if you weren’t there?	CFN7	70.80%	8.85%	2.36%	1.18%	16.81%
Your Care from Doctors	1. Did the doctors treat you with courtesy and respect?	CFD1	0.26%	0.52%	1.56%	4.16%	93.51%
	2. Did the doctors listen carefully to you?	CFD2	0.26%	0.78%	1.30%	7.01%	90.65%
	3. Did the doctors explain things in a way you could understand?	CFD3	0.00%	0.26%	2.86%	9.90%	86.98%
	4. Did the doctors talk in front of you as if you weren’t there?	CFD4	62.80%	4.17%	2.68%	4.46%	25.89%
	5. Did you have confidence and trust in the	CFD5	5.57%	0.80%	2.39%	7.16%	84.08%

	doctors treating you?						
Operations and Procedures	1. Did the doctor explain the risks and benefits of the operation or procedure in a way you could understand?	OAP1	1.77%	1.77%	3.19%	12.41%	80.85%
	2. Did the doctor explain beforehand what would be done during the operation or procedure?	OAP2	3.31%	1.84%	2.57%	11.76%	80.51%
	3. Did the doctor answer questions about the operation/procedure in a way you could understand?	OAP3	1.89%	1.13%	1.51%	10.19%	85.28%
	4. Did the anaesthetist explain how he/she would put you to sleep or control your pain?	OAP4	6.07%	1.21%	4.86%	10.93%	76.92%
Cleanliness	1. Were the hospital room, toilets, and ward kept clean?	C1	1.84%	1.05%	3.42%	15.26%	78.42%
	2. Did the doctors wash or clean their hands before touching you?	C2	1.91%	1.36%	2.18%	11.17%	83.38%
	3. Did the nurses wash or clean their hands before touching you?	C3	3.34%	0.56%	2.79%	11.42%	81.89%
Consistency and Coordination of care	1. Did the doctors/nurses say different things? Sometimes in a hospital, doctors /nurses will say one thing and another will say something quite different. Did this happen to you?	CCC1	61.40%	6.99%	4.04%	9.93%	17.65%
	2. Did the doctors and nurses work well together?	CCC2	0.27%	0.27%	1.06%	11.67%	86.74%
Treatment	1. Overall, did you feel you were treated with	TRD1	1.06%	0.53%	1.06%	8.44%	88.92%

with Respect and Dignity	respect and dignity while you were in the hospital?						
	2. Did discussions about your condition or treatment occur in private?	TRD2	6.28%	0.55%	3.55%	8.74%	80.87%
	3. Were you given privacy while being examined or treated?	TRD3	1.08%	0.27%	1.88%	10.22%	86.56%
Involvement	1. Did you receive sufficient amount of information about your condition and treatment?	I1	0.00%	1.34%	2.95%	13.40%	82.31%
	2. Did staff willing to listen to your healthcare problems?	I2	1.68%	0.84%	5.03%	12.85%	79.61%
Patient Rights and Feedback	**Indicators**	**Code**	**No**	**Yes**			
	1. Did you actually make a formal complaint while at the hospital?	PRF1	93.71%	6.29%			
	2. Did the hospital staff encourage your feedback?	PRF2	27.93%	72.07 %			
	3. Were you made aware of your patient rights at the hospital?	PRF3	37.72%	62.28 %			
Pain Management in this Hospital	**Indicators**	**Code**	**Never**	**Seldom**	**Half of the Time**	**Most of the Time**	**Always**
	1. Did your doctors explain the amount of pain to expect?	PMIT H1	4.45%	0.30%	6.53%	17.21%	71.51%
	2. Did your nurses explain the amount of pain to expect?	PMIT H2	5.40%	1.27%	8.89%	20.63%	63.81%
	3. Was your pain well controlled?	PMIT	0.90%	0.60%	3.30%	20.12%	75.08%

		H3					
Medication management in this Hospital	1. Were the purposes of all medications sufficiently explained to you?	MMH1	1.53%	1.02%	3.58%	13.04%	71.61%
	2. Were the possible side effects of medicine explained to you?	MMH2	8.86%	4.11%	7.28%	16.77%	62.97%
When You Left the Hospital	1. Did you receive written information about how to manage your condition and recovery at home?	WYLTH	10.42%	1.25%	8.75%	15.83%	63.75%
Waiting for Admission	1. Was the admission staff helpful?	WFA1	2.14%	1.07%	4.28%	12.30%	80.21%
	2. On admission, were you provided with sufficient information about your stay?	WFA2	2.81%	3.04%	0.28%	6.63%	11.88%
	Indicators	**Code**	**More than hour**	**31mins-1hour**	**16-30min**	**1-15min**	**No Wait**
	3. How long did you wait for a bed after you arrived at the hospital?	WFA3	7.01%	3.77%	11.32%	18.60%	59.30%
	Indicators	**Code**	**Never**	**Seldom**	**Half of the Time**	**Most of the Time**	**Always**
Food	1. Were you satisfied with the quality of the hospital food?	F1	4.82%	2.83%	14.45%	20.40%	57.51%
	2. Were you satisfied with the temperature of the hospital food?	F2	5.71%	2.57%	13.14%	21.14%	57.43%

Note: NA/Missing/Unspecified was excluded in the computation of the percentage above

Appendix 4.L Multiple regression analysis of 13 patient experience constructs

Code	**Variables**	**Predictor variables**	R^2
Response Variables			
CN_1	Care from Nurses	Patient's self-reported Health status and length of stay (1 night compared with longer than 1 night)	.036
CD_1	Care from Doctors	Patients who stayed in hospital for 1 night were more likely to rate care from doctors higher than those who stayed longer. Similarly, patients who had less than 2 hospital visits were more likely to rate care from doctors higher than those who had more frequent hospital visits.	.023
O_1	Operations and Procedures	No significant parameter in the model	
C_1	Cleanliness	No significant parameter in the model	
CC_1	Consistency and Coordination	Emirate nationals are more likely to rate consistency and coordination of care lower.	0.012
RD_1	Treatment with Respect and Dignity (TRD)	It shows that Educ1 is only significant parameter in the model.	0.126
I_1	Involvement	L_3 and L_4 are significant parameters in the model.	0.037
PM^1	Pain Management in the Hospital (PMH)	F_1 and self- reported Health status are significant parameters in the model.	0.073
MM_1	Medication Management in the Hospital (MMH)	It shows that L_1 and Health status are significant parameters in the model.	0.034
LH_1	When You Left The Hospital (WYLH)	No significant parameter in the model	
WA_1	Waiting For Admission	L_3, A_2, A_3, and MS_2 are significant parameters in the model.	0.059
F_1	Food	L_1, L_3, and A_1 are significant parameters in the model.	0.05

5. CHAPTER FIVE- Cross-sectional analysis of 27 hospitals in Abu Dhabi: evaluation of the impact of accreditation on patient experience

5.1 Introduction

The accreditation process requires resources. Therefore, the return on investment needs to be measured in order to justify resource allocation. While the costs of accreditation can be determined by simple accounting principles, so far no studies in the Middle East have compared key outcome parameters, such as patient satisfaction or patient experience, between accredited and non-accredited hospitals. The level of patient satisfaction and patient experience has financial repercussions for the healthcare provider. This is largely due to satisfied patients being willing to return and to recommend the hospital to relatives and friends. Patient evaluations of care are believed to be a key parameter that measures quality of care in a hospital setting (Cleary *et al*., 1993; Guzman *et al*., 1998; Nelson-Wernick *et al*., 1981). Few investigations have been performed on the subject of hospital accreditation and patient satisfaction. As emphasised by Greenfield and Braithwaite (2008), there is limited data on the influence of hospital accreditation on patient satisfaction. The existing investigations (Heuer, 2004; Fong *et al*., 2008) have major limitations, including small sample sizes, and absence of validated instruments to assess patient satisfaction. The available investigations could find no relationships between accreditation and patient satisfaction (Greco *et al*., 2001; Heuer, 2004). For example, a cross-sectional retrospective examination of the relationship between 41 New Jersey and Eastern Pennsylvania acute care not-for-profit hospitals' accreditation scores and patient satisfaction ratings revealed no association between them (Heuer, 2004). Salmon *et al.* (2003) found no difference in the effect of accreditation on patient satisfaction between intervention and control groups. Similarly, another cross-sectional study found patient-reported measures of quality and satisfaction of both accredited and non-accredited health plans could not be differentiated (Beaulieu and Epstein, 2002). Both of these investigations utilised secondary data from professional bodies' databases that could not be modified to fit the experimental design.

In an Egyptian quasi-experimental cluster comparison between 30 accredited non-governmental health (NGO) units and 30 non-accredited matched NGO units, the mean patient satisfaction scores were significantly higher among the accredited units regarding: cleanliness, comfort of waiting area, waiting time, satisfaction with unit staff and overall satisfaction. No significant differences were reported in provider satisfaction except for the overall satisfaction score. (Al Tehewy *et al*., 2009). The difference between the hospital system and primary healthcare lies in the complexity and diversity of services: inpatient, ambulatory, diagnostic and rehabilitative. This may explain the discrepancy between satisfaction results at the hospital level and the NGO unit level. Thus, this investigation cannot be generalised to the hospital setting. Furthermore, it used descriptive statistics only to describe the patient population and did not analyse the effect of confounding patient level variables on patient satisfaction. Our research on patient experience has filled this gap by using multiple regression to test all patient level variables and patient experience scores (see Chapter Four). In addition, Al-Tehewy *et al*. (2009) found a short-term positive effect on satisfaction but was limited by the unavailability of pre-intervention measures (pre-accreditation). They recommended that future studies use controlled research pre- and post-designs to evaluate the effect of accreditation on the health services. The author has responded to this call by using a time series analysis of quality measures 1 year pre-accreditation and 3 years post-accreditation in order to evaluate the causal effect of accreditation on quality measures (see Chapter Six).

In Germany, Sack *et al*., (2010) conducted a cross-sectional survey of inpatient satisfaction (measured by the recommendation rate) and the accreditation status of cardiology units. Data from 3,037 patients (response rate of 55%) was collected from 15 accredited and 10 non-accredited cardiology units. Different control variables such as staffing level were considered. The Picker survey was used (Sack *et al*., 2010). There were no significant differences between the recommendation rate and satisfaction of care between accredited and non-accredited groups. However, the examination did not test for associations between patient demographics and hospital characteristics as confounding variables influencing patient satisfaction. This has already been addressed in the previous thesis chapter on patient experience (see Chapter Four). The hospitals examined had just received accreditation and, therefore, the full benefits may not have yet emerged. The individual accreditation programmes studied varied with respect to scope and standards and these differences between the two accreditation programmes were not considered. The focus of the review on cardiology units begs the question as to whether the results could be replicated or if they would differ if the study was conducted in patients within another medical discipline.

A second German cross-sectional study was conducted by Sack *et al*. (2011) using a prospective design examining the association between hospital accreditation and patient satisfaction. The sample consisted of 73 hospitals and 37,700 inpatients. The Picker Inpatient questionnaire was used. There was no significant difference for the recommendation rate between accredited and non-accredited hospitals. The results supported previous notions that accreditation is not linked to quality of care as measured by the patient's willingness to recommend. The results were limited, as some hospitals had completed accreditation or re-accreditation recently.

What is clear is that there is an urgent need for further research to uncover more evidence regarding accreditation's impact on patient satisfaction. Although the relationship between accreditation and patient satisfaction remains under researched, the limited investigations have found no relationships (Greco, *et al*., 2001; Dean Beaulieu and Epstein, 2002; Heuer, 2004). An evaluation of the relationship between patient satisfaction ratings and not-for-profit hospital accreditation scores found no association, either summatively or formatively (Heuer, 2004). Similarly, there was no differentiation of patient-reported measures of quality and satisfaction between accredited and non-accredited health plans (Dean Beaulieu and Epstein, 2002). Comparisons have been made between patients' and health professionals' views about compliance with accreditation standards. The satisfaction rank order correlations for the two groups were similar, although there were differences in specific details (Durieux, *et al*., 2004). A survey of patients during the accreditation of general practices revealed that patients scored doctors' interpersonal skills higher than practice issues such as, access and information availability (Greco *et al*., 2001).

All of the research papers testing for the association between accreditation and patient satisfaction (Beaulieu and Epstein, 2002; Heuer, 2004; Greco, *et al*., 2001) lacked the methodological rigour (e.g. sample size and validated survey instruments) required to generate substantive conclusions. Patient satisfaction as a concept has been criticised in the previous chapter (Hall and Dornan 1988; Aharony and Strasser 1993; Carr-Hill 1992; Williams 1994; Draper and Hill 1995; Sitzia and Wood 1997). Issues include concerns regarding the subjectivity, unreliability and the misleading nature of patient satisfaction surveys (Table 4.1). Hence, patient experience surveys are a superior method for collecting patient evaluations of care (see Chapter Four). To the best of the author's knowledge, there are no published examinations on the impact of accreditation on patient experience. This study attempts to fill this gap in the knowledge base.

The primary objective of the study is to explore the impact of hospital accreditation on patient experience scores.

Some researchers point out that accreditation improves a hospital's operations and performance in terms of effectiveness and efficiency (Helbig *et al*., 2006). In addition, accreditation systems focus on the quality of patient care. As a result, it is expected that patient experience will be improved. According to an investigation of 73 hospitals (Sack *et al*. 2011) there was no significant difference in the recommendation rate between accredited and non-accredited hospitals. However this may be explained by the substantial variability between the study hospitals. As emphasised by Greenfield and Braithwaite (2008), there is limited data on the influence of accreditation of hospitals on patient experience. Whether accreditation of hospitals truly ensures high quality healthcare is a crucial question that remains to be answered. This highlights the need to provide evidence that accreditation procedures result in improved patient experience. We hypothesise that if accreditation improves quality of care, then this should be positively associated with better patient experience scores. This chapter describes the methodology, analysis and results of the cross-sectional study of 27 hospitals in Abu Dhabi, UAE.

5.2 Methods

This section reports on the cross-sectional analysis of 27 Abu Dhabi hospitals examining the relationship between accreditation and patient experience scores. This non-experimental cross-sectional study evaluates the impact of hospital accreditation on 27 hospitals within Emirate of Abu Dhabi. Retrospective data analysis will be performed on the secondary data of patient experience scores that have been published by the Health-Authority of Abu

Dhabi (HAAD) in 2010. The patient experience data in this report were collected by a third party, namely GRMC Consultancy, and derived from the Health Authority-Abu Dhabi Annual Consumer Report. The survey tool used is the modified Hospital Consumer Assessment of Healthcare Providers and Systems (HCAHPS) Survey. The HCAHPS survey is a standardised, validated, publicly reported survey of patients' perspectives of hospital care.

5.2.1 Sampling

5.2.1.1 The hospital sample

In the sampling frame there are 39 facilities termed 'hospitals' in the Emirate of Abu Dhabi according to the Health Authority license. Public hospitals include 12 hospitals run by SEHA (a government-owned company) and two military hospitals. Since 2008 the government has separated the operation of its public hospitals (through SEHA) from the regulation of hospitals (through HAAD). Other hospitals include 25 private facilities, of which nine do not have inpatient beds. Most of these are ambulatory surgery, dental, and diagnostic facilities. Hospitals in the Emirate of Abu Dhabi typically provide both inpatient and outpatient services, which are integrated in many facilities. Outpatient services account for a majority of the encounters at hospitals: 92 percent of encounters at private hospitals and 66 percent of encounters in SEHA hospitals are in the outpatient setting. The 12 SEHA hospitals provide about 60 percent of the civilian inpatient treatments, 70 percent of civilian emergency care, but only 27 percent of civilian outpatient services. The private hospitals provide about 40 percent of civilian inpatient services, but only 29 percent of civilian emergency care. Private hospitals provide most of the civilian outpatient services—about 70 percent. The author identified 39 licensed hospitals operating in the Emirate of Abu Dhabi. These hospitals have a total capacity of 3,579 beds employing 18,109 staff (inclusive of 3,600 physicians) and have 13,237,794 patient visits per annum (HAAD statistics, 2010).

5.2.2 Data collection of the patient experience scores for the 27 hospitals cross-sectional study

GRMC and HAAD to conducted questionnaire-based interviews with statistically significant samples of patients undergoing a recent experience at the study hospitals. The patients provided informed consent to participate in the survey. The survey was conducted via CATI (Computer Assisted Telephone Interviews) and face-to-face interviews by GRMC operatives in Arabic and English languages along with other ethnic languages (Urdu, Farsi, Hindi etc.), as required. For CATI, the approach relied on data collected via a telephone interview. In order to increase the survey accuracy, GRMC contacted patients whose most recent experience of visiting the study hospitals was not longer than a fortnight ago. To do so, hospitals were requested to provide patient level data for randomly selected dates during a four-month period. This patient database included information fields comprising of: patient name, patient contact number, name of hospital visited and specialty visited (speciality limited to inpatient, outpatient or emergency department). Certain patient demographics (gender, date of birth and nationality) were also provided. The survey commenced at the beginning of 2010 and during this year more than 34,200 patients of hospitals throughout the emirate were interviewed and 23,440 forms were completed and validated.

The HCAHPS survey asks discharged patients 27 questions about their recent hospital stay. These were 18 core questions about critical aspects of patients' hospital experiences related to several constructs (medical staff, allied health professionals, the discharge process, inpatient care, tangibles, non- tangibles and the overall rating of hospital). The survey was also used in the outpatient setting, the constructs of which include: medical staff, tangibles, non-tangibles and the overall rating of the facility. The survey responses are graded on a 4 point Likert Scale (1-Never, 2- Sometimes, 3-Usually 4- Always). The responses were then aggregated into percentages to get an overall percentage per question and then per construct. The construct related to the overall rating of the hospital was graded on a 10-point scale. The patient experience survey and the data are secondary and thus this researcher had no role in its specification or collection.

5.2.3 Data analysis

To explore the research question of whether accredited hospitals had higher patient experience scores, independent sample *t*-tests were used to test whether there is a significant difference in patient experience between accredited and non-accredited hospitals in the cross-sectional study. The independent variables (number of beds, patient volume, doctor-patient ratio and nurse-patient ratio) were explored with regard to accredited and non-accredited hospitals and patient experience (overall hospital rating) using Pearson's correlation coefficients (Table 5.1). The independent sample *t*-test was used to test the significant difference of patient experience constructs between accredited and non-accredited hospitals (Table 5.2 and Table 5.3). The construct scores were calculated as the aggregate of the item scores within each construct and were thus assumed to approximate an interval level variable. Multiple regression analysis could not be used, as the number of hospitals surveyed by GRMC was too small (n=27) for the number of parameters studied (Field, 2005). Hence, bivariate statistics were used. All hypotheses tests with a $P \leq 0.05$ were considered significant.

Table 5.1 List of independent variables (hospital characteristics for the 27 hospitals)

	Hospital level variables
1.	Hospital size (number of beds)
2.	Accreditation status (accredited versus non-accredited)
3.	Hospital ownership status (private or government)
4.	Staffing (nurse to patient ratios and doctor to patient ratios)

Table 5.2 List of the GRMC inpatient experience survey constructs

Constructs of GRMC patient experience survey	Survey items (based on a 4 point Likert Scale)
Medical staff (Range of values 4-16)	Courtesy, Friendliness, Proper Communication and Response Time
Allied health professionals (range of values 4-16)	Courtesy, Friendliness, Proper Communication and Time Spent
The discharge process (Range of values 6-24)	Timely and Smooth, Discharge Process, Instructions Provided for Care at Home Medication and Provision for Follow up Care
Inpatient care (Range of values 2-8)	Pain Management, Medication
Tangibles (Range of values 4-16)	Accommodation Facility, Food and Beverage, Visual Appeal, Parking Facility
Non tangibles (Range of values 6-24)	Convenience of Location, Convenience of Visiting Time, Overall Cleanliness, Resolution of Medical Problem, Paperwork at Reception, Noise Level
The overall hospital rating (Range of values 1-10)	Scale is 1-10 (10 being the highest rating) Reflected as a percentage of the aggregated responses from patients

Note: all construct scores are reflected as a percentage of the aggregated responses

Table 5.3 List of outpatient survey constructs

Constructs of GRMC patient experience survey	Survey items (based on a 4 point Likert Scale)
Medical staff (Range of values 6-24)	Courtesy, Friendliness, Proper Communication, Time spent, explanation of test and treatment and explanation of medical condition.
Tangibles (Range of values 6-24)	Parking Facility, Facility and Equipment, Comfort of Waiting Area, Clarity of Healthcare Facility Internal Signs, Visual Appeal
Non tangibles Range of values 5-20)	Convenience of Location, Overall Cleanliness, Privacy, Waiting Time And Paperwork Involved
The overall hospital rating (Range of values 1-10)	Scale is 1-10 (10 being the highest rating) Reflected as a percentage of the aggregated responses from patients

Note: all construct scores are reflected as a percentage of the aggregated responses

5.3 Results

Table 5.4 displays data from 14 accredited and 13 non-accredited hospitals with the inpatient, outpatient and combined (inpatient + outpatient) average overall hospital ratings. Across all hospitals, the highest score for inpatients was seen in Al Noor – Airport Road (accredited) with 91.1 and the lowest from Al Silla (non-accredited) with 74.7. The highest outpatient rating was at NMC – Al Ain (accredited) with 86.8 and the lowest from Al Ahalia with 75.6 score (accredited). The GRMC findings informs us that hospitals with high inpatient overall hospital ratings do not necessarily record high outpatient overall ratings.

Table 5.4 GRMC patient experience scores (Overall hospital ratings) for accredited and non-accredited hospitals

Status	Hospital	Inpatient Overall hospital rating (Scale 1-10)	Outpatient Overall hospital rating (Scale 1-10)	Combined (inpatient + outpatient) Average
Accredited Hospitals	Al Ain	84.7	83.1	83.9
	SKMC	88.3	84.9	86.6
	Tawam	88.3	83.3	85.8
	Al Corniche	88.3	85.5	86.9
	Al Rahba	88.3	85.1	86.7
	NMC- Abu Dhabi	90.7	84.5	87.6
	Lifeline	83.0	86.7	84.9
	AL Noor Hospital- Khalifa	89.5	86.4	88.0
	Oasis	84.3	82.0	83.2
	NMC- Al Ain	88.4	86.8	87.6
	AL Noor Hospital- Al Ain	90.1	84.7	87.4
	Al Ahalia	81.5	75.6	78.6
	Al Noor - Airport Rd.	91.1	85.1	88.1
	Al Salama	83.6	84.0	83.8

Non-accredited Hospitals	Dar Al Shifa	85.5	84.7	85.1
	Emirates Int'l	89.4	84.9	87.2
	Emirates-French	81.8	84.6	83.2
	Al Raha	84.9	84.7	84.8
	Specialised Medical Care	84.7	86.7	85.7
	National	87.7	84.9	86.3
	Madinat Zayed	88.5	83.3	85.9
	Al Mafraq	85.7	83.1	84.4
	Al Ghayathi	76.7	84.7	80.7
	Al Mirfa	75.3	79.9	77.6
	Al Silla	74.7	78.0	76.4
	Al Wagan	88.0	80.3	84.2
	Delma	75.3	79.6	77.5

Note: The overall hospital rating is the aggregated percentage of the patients' response to a single question in the GRMC survey: 'Using any number from 0 to 10, where 0 is the worst hospital possible and 10 is the best hospital possible, what number would you use to rate this hospital during your stay?

5.3.1 Comparison of hospital accreditation and patient experience scores

The small sample *t*-test for difference of means assumes that the distribution is normal with unknown and equal population standard deviation. Since the data were interval level, the one-tailed test was used to determine if the population mean of accredited hospitals is greater than the mean of non-accredited hospitals (Uacc > Unon-acc). Table 5.5 demonstrates that the computed mean for accredited hospitals of 87.2 for inpatients was higher compared to the outpatient score of 84.1. The coefficient of variation (CV) or 'relative variability' permits comparison of the scatter of variables with different measurements by making it unitless. The computed CV of 3.5% and 3.3% for accredited inpatient and outpatient hospital ratings shows similar variability in scores. The computed mean of non-accredited hospitals in both inpatient and outpatient departments was 82.9 and 83, respectively, suggesting that patient experience ratings of both departments in non-accredited hospitals were generally equal. The CV in non-accredited hospitals (6.6%) for the inpatients is twice of the outpatient result (3.2%) and demonstrates that inpatient score has more variability than that of the outpatients. The medians for the accredited and non-accredited outpatient scores were virtually the same. Conversely, the inpatient means and medians in accredited hospitals were approximately four percentage points higher than non-accredited hospitals. The inpatient mean rating of accredited hospitals is significantly higher than non-accredited hospitals. However, there was no significant difference for the outpatient mean rating ($P \leq 0.26$). Nonetheless, analysis of the combined means (inpatient + outpatient) indicates that the accredited hospitals performed significantly better than non-accredited hospitals with regard to the overall hospital rating ($P \leq 0.04$).

Table 5.5 *t*-test of outpatient and inpatient means (overall hospital rating) between accredited and non-accredited hospitals

Accredited	**Inpatient**	**Outpatient**	**Combined Average**
Mean	87.2	84.1	85.6
Median	88.3	84.8	86.7
Standard Deviation (SD)	3.1	2.8	2.6
Coefficient of Variation (CV)	3.5%	3.3%	3.0%
N	14	14	14
Non-Accredited	**Inpatient**	**Outpatient**	**Combined**
Mean	82.9	83.0	83.0
Median	84.9	84.6	84.4
SD	5.5	2.7	3.7
Coefficient of Variation (CV)	6.6%	3.2%	4.5%
N	13	13	13
Significance tests			
***t*-value**	2.25	0.66	1.81
P- value	0.02	0.26	0.04

Note: Overall hospital rating is based on a single question in the GRMC survey.

Table 5.6. below compares the inpatient GRMC survey construct scores between accredited and non-accredited hospitals. The construct scores were calculated as the aggregate of all items for each respective construct and reflected as a percentage. The standard deviations (SD) are larger in non-accredited hospitals than in accredited hospitals for all constructs indicating greater variability in the scores in non-accredited hospitals. There is approximately a 3-4 % difference in the means between the two groups was for all constructs. However the medians for both 'inpatient care' and 'non-tangibles' were similar between the groups with less than a percentage point difference. The mean inpatient construct scores of accredited hospitals are significantly higher than non-accredited hospitals for all constructs with the exception of the 'non-tangibles'. The 'non-tangibles' construct items are: Convenience of Location, Convenience of Visiting Time, Overall Cleanliness, Resolution of Medical Problem, Paperwork at Reception, Noise Level.

Table 5.6 *t*-test comparing differences of the GRMC inpatient construct scores between accredited and non-accredited hospitals

	Accredited (n=14)					
Constructs	Medical staff	Inpatient care	Tangibles	Non-tangibles	Allied Health Professional	Discharge Process
Mean	92.5	90.6	88.4	83.6	89.9	89.1
Median	93.0	90.0	90.0	83.5	91.4	90.6
SD	0.7	1.5	3.8	3.0	3.6	3.4
	Non- accredited (n=13)					
Mean	89.1	87.3	84.9	81.5	85.1	84.5
Median	92.0	90.0	87.0	83.0	87.2	87.3
SD	5.7	5.3	6.2	3.9	6.1	6.8
Significance tests						
***t*-value**	2.2206	2.2319	1.7875	1.522	2.524	2.233
P- value	0.0178	0.0174	0.0430	0.0703	0.009	0.0174

Table 5.7. demonstrates that the outpatient means for all constructs are higher in accredited hospitals except for 'non-tangibles'. The medians however, are the same between the two groups. The construct 'tangibles' recorded the highest SD in the accredited group indicating greater variation in the scores. There is no significant difference in the outpatient construct scores between accredited and non-accredited hospitals.

Table 5.7 Comparison of outpatient GRMC survey constructs between two hospital groups

	Accredited (n=14)		
	Medical staff	**Tangibles**	**Non-tangibles**
Mean	90.6	86.6	81.8
Median	91.0	87.0	82.5
SD	1.0	2.5	1.9
	Non-Accredited (n=13)		
	Medical staff	**Tangibles**	**Non-tangibles**
Mean	89.9	86.2	81.9
Median	91.0	87.0	82.0
SD	1.4	1.3	1.1
Significance tests			
***t*-value**	1.5135	0.6258	-0.2236
P-value	0.0714	0.2686	0.4122

Note construct scores are the aggregate of all items for that construct

5.3.2 Evaluation of public-private status in relation to patient experience

The *t*-test was used to determine if the means of the two types of the facilities in each group differ. The assumptions of equality of variance were satisfied using the Levene's test. Table 5.8 shows that private hospitals had higher inpatient and outpatient overall hospital ratings.

Table 5.8 Comparison of the overall hospital ratings (public vs. private hospitals)

Overall facility rating		**N**	**Mean**	**SD**	**Std. Error Mean**
Inpatient	Public	12	83.51	6.04	1.74
	Private	15	86.41	3.31	0.85
Outpatient	Public	12	82.57	2.49	0.72
	Private	15	84.42	2.74	0.71
***Combined (out+inpatients) overall hospital rating**	Public	12	83.04	3.95	1.14
	Private	15	85.42	2.55	0.66

*Note: *combined is the inpatient + outpatient overall hospital rating*

The results show that variances in the overall rating of the hospital for inpatients and combined are significant and significantly different (Table 5.9). Thus the *t*-value for unequal variances was used. The mean ratings for the inpatient, outpatient and combined overall ratings were not significant between private and public hospitals.

Table 5.9 Results of the independent sample *t*-test between public and private hospitals (comparison of the overall hospital rating)

Assumptions		**Levene's Test for Equality of Variances**		***t*-test for Equality of Means**						
		F	Sig.	*t*	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	95% Confidence Interval of the Difference	
									Lower	Upper
Equal variances assumed	Inpatient	11.45	0.00*	-1.59	25	0.12	-2.91	1.82	-6.66	0.85
	Outpatient	0.53	0.47	-1.81	25	0.08	-1.85	1.02	-3.95	0.25
	Combined	4.53	0.04*	-1.89	25	0.07	-2.37	1.25	-4.96	0.21
Equal variances not assumed	Inpatient			-1.49	16.18	0.15	-2.9	1.94	-7.02	1.21
	Outpatient			-1.83	24.51	0.07	-1.85	1.01	-3.93	0.22
	Combined			-1.81	18.21	0.08	-2.37	1.31	-5.14	0.38

5.3.3 *Correlation coefficients between hospital characteristics and the overall ratings of the hospitals*

The correlation coefficients between the number of beds, doctor to patient ratio, nurse to patient ratio and the outpatient, inpatient and combined facility ratings were not significant (Table 5.10). However, the relationship between the number of patients and inpatient overall hospital rating is positive, significant and moderately strong (r = 0.49: P ≤ 0.01). Conversely, the relationship between the number of patients and outpatient overall hospital rating is weak and not significant (r = 0.01: P ≤ 0.65). Consequently, the relationship between the number of patients and the combined overall facility rating is positive but weak and this relationship is significant (r = 0.38: P ≤ 0.04).

Table 5.10 Correlation coefficients between hospital characteristics and thee overall hospital ratings

Variable	Statistic	Inpatient overall rating of the hospital	Outpatient overall rating of the hospital	Combined overall rating of the hospital
Number of beds	Correlation coefficient	0.29	0.09	0.25
	Sig. (2 tailed)	0.13	0.64	0.21
Number of patients (1000)	Correlation coefficient	0.49	0.01	0.38
	Sig. (2 tailed)	0.01*	0.65	0.04*
Doctor-patient ratio	Correlation coefficient	0.23	-0.16	0.10
	Sig. (2 tailed)	0.23	0.41	0.61
Nurse- patient ratio	Correlation coefficient	0.08	-0.03	0.04
	Sig. (2 tailed)	0.66	0.86	0.81

Note: n=27

Table 5.11 Summary of cross-sectional study results

Variable	Statistical tests	Inpatient overall rating of the hospital	Outpatient overall rating of the hospital	Combined (inpatient + outpatient) overall rating of the hospital
Accredited vs. non-accredited	**Small sample *t*-*test for difference of means***	Significantly higher in accredited hospitals (Note: this included all patient experience constructs except for 'non-tangibles')	Not significant	Significantly higher in accredited hospitals
Public vs. private	**Independent samples *t*-test**	Not significant	Not significant	Not significant
Number of beds equivalent to hospital size	**Correlation Coefficient**	Not significant	Not significant	Not significant
Number of patients equivalent to patient volume	**Correlation Coefficient**	Significant positive correlation	Not significant	Significant weak positive correlation
Doctor-patient ratio	**Correlation Coefficient**	Not significant	Not significant	Not significant
Nurse –patient ratio	**Correlation Coefficient**	Not significant	Not significant	Not significant

5.4 Discussion

Accredited hospitals have significantly higher inpatient experience scores when compared to non-accredited hospitals. However there was no significant difference in the outpatient experience scores. The influence of hospital level variables on the patient experience namely, hospital size, ownership status, patient volume, doctor-patient and nurse-patient ratios has been tested. Only patient volume has a significant positive correlation with inpatient experience as measured by the inpatient overall hospital rating. This implies that larger hospitals, which are better resourced (in terms of equipment, services and staffing), provide a more positive patient experience.

Although the findings of this study suggests a positive association between accreditation and the patient experience scores, the use of bivariate statistics limits our understanding of this relationship. The use of bivariate statistics was necessary because of the small sample size (n=27) of the GRMC survey and thus limited our ability to draw valid conclusions about any associations because of the failure to control for confounding factors. The GRMC survey used a 4-point Likert scale, which tends to overscale the answers, as there is no neutral mid-point. This can lead to survey bias as respondents are forced to select a side. Therefore answers tend to be skewed to one side, which is avoided if a 5-point Likert scale is used as we have done in the patient experience analysis in Al Noor Hospital (see Chapter Four). In addition, the HCAPHS survey used was modified by GRMC thus affecting the validity of the survey tool. Furthermore, the use of secondary data did not allow the researcher to modify the data collection to the aims of the study or to control for the effects of confounding variables. The researcher was also unable to verify the validity, accuracy and reliability of the data set.

Cross-sectional designs (one point in time) and/or comparative static analysis of data have methodological weaknesses. As noted in the previous chapter, patient experience is a complex and dynamic concept and is influenced by other variables, which were not tested in this cross-sectional study. For instance, our patient experience analysis in Al Noor Hospital (see Chapter Four) has demonstrated links between patient experience scores and patient socio-demographics, stay characteristics and patient experience constructs. Nonetheless, this 27 hospital cross-sectional analysis is amongst the first to demonstrate a positive association between hospital accreditation and patient experience (measured by the overall rating of the hospital and GRMC patient experience constructs). As emphasised by Greenfield and Braithwaite (2008), there are limited data on the influence of accreditation on patient evaluation of care. These investigations (Heuer, 2004; Fong *et al*. 2008) have limitations (e.g. small sample sizes or the failure to use properly validated instruments to assess patient satisfaction) and their findings are inconsistent with our observation. The large number of questionnaires collected by GRMC, comparison of a single accreditation methodology -JCI- and analysis of hospital factors are strengths of this 27 hospital cross-sectional study. However, it is limited in its exploration of the influence of patient demographics on patient experience. Nevertheless, this is included in the patient experience analysis of this thesis (see Chapter Four). The GRMC cross-sectional study also has limited generalisability due to the research setting, the use of bivariate statistics and secondary data. Hence, the findings do not prove that accreditation is a suitable instrument for quality improvements. This requires a time series analysis methodology (see Chapter Six). Accreditation may be advantageous due to standardisation of procedures, cost containment and market reputation (as accreditation is perceived by the public as a quality indicator). Indeed, accreditation programmes focus primarily on structures and processes in patient care that intend to cover a patient's journey from admission through to discharge from the hospital (Collopy, 2000). The underlying assumption is that if hospital processes are properly structured and coordinated, patient experience is likely to be improved.

The additional weakness of cross-sectional designs is that they do not allow one to analyse the dynamic nature of accreditation over time. The cross-sectional analysis may have resulted in a significant relationship, but we argue that it only demonstrates an association and not a causal relationship. This is fundamentally because it is a static analysis. It seems highly likely that those hospitals that are early adopters of an international accreditation system are likely to be the higher quality and more progressive ones while the non-adopters are more likely to be lower quality institutions. Hence, the accredited hospitals are likely to have exhibited higher patient experience scores even before accreditation was implemented. More fundamentally, in order to rigorously test the impact of accreditation, it is necessary to investigate change over time, which a cross-sectional study is incapable of doing, by definition. Ideally, what is required is a longitudinal analysis. Also, there needs to be consideration of how long it takes a hospital to implement accreditation standards and show improvements or not. Suppose a hospital was accredited in December 2009, this implies that there is a need to analyse data for the year before implementation and either one year or two years after. Longitudinal designs are necessary as cross-sectional designs cannot alone establish causality. Furthermore, accreditation is used as a framework for continual improvement so that even a comparative static analysis will not capture the effect of time and the potential benefits of accreditation.

Clearly, it is equally important to carefully select the indicators of healthcare to test the impact of accreditation. While patient perceptions of care are important for inclusion in the analysis, it is crucial that quality indicators that measure patient outcomes (infections etc.), are researched. This dissertation will use a four-year time series analysis of 27 quality measures during the periods before and after accreditation (through a month by month comparison) to negate the methodological weaknesses of cross-sectional studies (see Chapter Six). This time series methodology will permit a rigorous test of whether accreditation impacts upon the quality of care actually delivered.

The findings of this cross-sectional study add value in some areas. While accreditation programmes vary with respect to scope and standards, all the accredited hospitals used the JCI accreditation programme. Firstly, the lack of accreditation's impact on patient experience in the outpatient departments could be due to the fact that accreditation standards are focused mainly on inpatient processes. These processes that improve the quality of inpatient care may not translate effectively into an outpatient environment. The outpatient departments typically see higher volumes with longer waiting times. The results show that there was no significant difference for the construct 'non-tangibles' between the hospital groups (Table 5.8). The 'non-tangibles' relate to care aspects such as Convenience of Location, Convenience of Visiting Time, Overall Cleanliness, Resolution of Medical Problem, Paperwork at Reception and Noise Level. The JCI standards do not deal with process flow concerns in administrative departments and focus largely on clinical services. This may be further be explained by the fact that all accredited hospitals were accredited with the hospital standards of JCI, which covers the inpatient and outpatient scope. JCI has a separate standard manual for accrediting ambulatory care facilities, which is specifically tailored to the outpatient setting. It is recommended that the hospital standards are reviewed to develop standards that have a quality impact in both the inpatient and outpatient settings as well as administrative flow concerns.

Secondly, this cross-sectional study is the first in the Middle East to examine the relationship between accreditation and patient experience. This has important policy implications as the regulatory authorities have begun to use patient experience data to measure the quality of care provided by healthcare organisations in the Emirate of Abu Dhabi. Such measures, if publicly reported, could have serious consequences on organisations in terms of reimbursement, market reputation, referrals and other financial concerns. This cross-sectional analysis on the impact of accreditation on patient experience does not provide sufficient evidence for organisations to embrace accreditation as a feasible measure to improve quality of care and patient experience. The time series analysis in the next chapter is designed to address this issue.

Thirdly, in this context, accreditation is believed to be at least an indicator of reasonable quality that may be easily identified by patients, as accreditation is voluntary in the UAE. There are many publications on the benefits of accreditation of healthcare providers (Beholz *et al*., 2003; Casey and Klingner, 2000; Schyve, 2000). If an organisation does not go through an accreditation process, it may indicate that the facility is not open to external evaluation of its performance and may lead to a competitive disadvantage (Gluck and Selbmann, 2000; Selbmann, 2004). It may well be that better organisations voluntarily seek accreditation as a validation of the quality of care they provide. It is not possible to establish a causal relationship between accreditation and patient experience using a cross-sectional analysis. It may well be that accreditation is a consequence of better performance and not a cause of it. The time series analysis in the succeeding chapter will enable us to test whether there is a causal relationship between accreditation and improved patient experience.

Fourthly, all accreditation efforts necessitate resources and for evidence-based management practices, rational resource allocation and the return of investment should be measured and monitored. If accreditation has a positive impact on patient experience then the return on investing in accreditation is worthwhile. Happy patients have a high willingness to return and to recommend the hospital to relatives and friends. Therefore, patient experience also has financial implications for a hospital and can be used by healthcare managers and quality leaders in creating a business case for accreditation. Thus, the cross-sectional study, with its methodological limitations, adds value in terms of signifying an association between two fundamental parameters of quality (accreditation and patient experience). Accreditation and patient surveys might be useful complements to one another and the process of accreditation should include outcome parameters such as patient experience. This warrants further review and is an important subject for future research.

Finally, the effects of accreditation are difficult to assess because accreditation is an on-going and dynamic quality improvement process. Therefore it is hard to define when the full benefits of accreditation may emerge. To measure these effects a longitudinal investigation is required. Thus the impact of accreditation on 27 quality measures will be evaluated using time series analysis, over a four-year period (see Chapter Six). The next chapter describes the interrupted time series analysis.

6. CHAPTER SIX: Time series analysis of a 150 bed hospital testing the impact of accreditation on quality measures (structures, processes and outcomes)

6.1 Introduction

The impact of accreditation has been researched adopting a variety of methodologies and research designs. There is a lack of rigorous research including the methodological challenges of measuring outcomes and attributing causality to these complex, changing, long-term social interventions to healthcare organisations (Øvretveit and Gustafson, 2003). Researchers have wrestled with a range of methodological issues, including research designs, selection bias, quality measurement, and the problems of evaluating outcomes. Most studies have used cross-sectional designs and/or comparative static analysis of data at two points in time (Salmon *et al*., 2003; Chandra *et al*. 2009; El-Jardali *et al*., 2008; Sack *et al*., 2010). Due to the dynamic nature of accreditation, such methodologies can only identify statistical associations between variables but cannot alone establish causality (Bowling, 2002). In order to draw causal inferences about the direct influence of accreditation on patients' health outcomes and clinical quality, a dynamic analysis that focuses on the effects of accreditation over time is needed (Ovretveit and Gustafson, 2003). This research directly addresses this issue by adopting a time series framework. A longitudinal analysis enables causal relationships between variables to be determined. Furthermore, research projects that did demonstrate improvements in quality measures could not be generalised to acute care settings as they focused on a specific measures (e.g. AMI measures), types of services (e.g. cardiology) or organisations (e.g. teaching hospitals) (Chen *et al*., 2003; Chandra *et al*. 2009; El-Jardali *et al*., 2008; Sack *et al*., 2010). This study is the ***first*** ever empirical interrupted time series analysis of accreditation designed to examine the impact of accreditation on hospital quality measures. No previous investigations have used this methodology as it is difficult to maintain a controlled environment during the period of study. However the hospital analysed did not undergo any significant organisational changes between 2009 and 2012. Thus, the leadership, organisational structure and the scope of services remained the same. Furthermore, the 27 quality measures selected reflect structures, processes and outcomes of care.

This research uses interrupted time series analysis to determine whether there are statistically significant changes in outcome variables as a result of an intervention, such as hospital accreditation. This design distinguishes between the effects of time from that of the intervention. A time series is a sequence of measurements observed at ordered points in time. The data are commonly composed of continuous or recorded outcome measures, reviewed at regular, evenly spaced intervals, in this case on a monthly basis. Interrupted time series is the most powerful, quasi-experimental design to evaluate longitudinal effects of such time-delimited interventions (Cook and Campbell, 1979; Gillings *et al*, 2004). Due to the strength of the design, the Cochrane Effective Practice and Organisation of Care Review Group (EPOC) (2002) of the Cochrane Collaboration have listed interrupted time-series (ITS) studies in its inclusion criteria. A time series is the result of both predictable and random elements thus being stochastic and non-deterministic realisations of an underlying data-generating process, as opposed to a deterministic process that is driven by entirely predictable forces (Yaffee and McGee, 2000). This chapter commences with an overview of various interrupted time series methods and the statistical issues which underpin them.

6.2 Methodology

The phrase, ‘interrupted time series analysis’, indicates the point in time at which the intervention is introduced thus causing an interruption to the series. Change points are specific points in time where the values of the time series may exhibit a change from the previously established pattern because of an identifiable experimental intervention like accreditation (Wagner *et al*., 2002). The choice of the beginning (2009) and end of each segment (2012) depends on the beginning and end of the intervention (JCI accreditation occurred in December 2009), with the possible addition of some pre-specified lag time to allow the intervention to take effect.

6.3 Study Design

Interrupted time series analysis, distinguishes between the effects of time from that of the intervention and is the most powerful, quasi-experimental design to evaluate longitudinal effects of such time-limited interventions (Cook and Campbell, 1979; Gillings *et al.*, 2004). The interruption splits the time series into pre-intervention and post- intervention (accreditation) segments so that segmented regression analysis of interrupted time series data permits the researcher to statistically evaluate the impact of an intervention on an outcome variable, both immediately and long-term; and the extent to which factors other than the intervention explain the change. The choice of the beginning (2009) and end of each segment (2012) is linked to the start of the intervention (JCI accreditation occurred in December 2009). In this study, two parameters were used to define each segment of the time series: level and trend. The level is the value of the series at the beginning of a given time interval (i.e. the Y intercept for the first segment, and the value immediately following a change point or intervention). The trend is the rate of change of a variable (the slope) during a segment. Segmented regression analysis enables identification of the level and trend in the pre-accreditation (pre-intervention) segment and changes in level and trend after accreditation (post-intervention).

6.3.1 Study population

The study was conducted in the private 150-bed, multispecialty, acute-care hospital in Abu Dhabi, UAE. The annual inpatient census was 15,000. The hospital treats approximately half a million ambulatory care patients per year. The scope of healthcare services is provided to all patient age groups, nationalities and payment types.

6.3.2 Data Source and study variables for Clinical Quality Measures

The outcome measures for the time series analysis incorporated clinical quality measures, including mortality rates etc., and were expressed as percentages, proportions or rates (Table 6.1). These performance differences were compared across monthly intervals between two time segments, one year pre- accreditation (2009) and three years post-accreditation (2010, 2011 and 2012) for the selected quality measures (Table 6.1). The principal data source was a random sample of 12,000 patient records drawn from a population of 50,000 during the study period (January 2009 to December 2012).

Slovin’s formula was used to calculate the sample size per month based on a 95% confidence interval from an average monthly inpatient census of 1500 patients. Each month (during the entire investigation period), a simple random sample of 24% of patient records were selected and audited from the monthly population.

Table 6.1 Quality measure definitions

Dimension of measurement	Code	Measures	Value	Variable Description
Patient Assessment	Y_1	Initial Medical Assessment done within 24 hours of admission	Percentage	To measure the timeliness of initial medical assessments for patients
	Y_2	Initial Nursing Assessment within 24 hr. of admission	Percentage	To measure the timeliness of initial nursing assessments for patients
	Y_3	Pain Assessment Form Completed 100% per month	Percentage	To measure the timeliness of pain assessments for patients and adherence to the pain management policy
	Y_4	Percentage of Completed Pain Reassessment	Percentage	To measure the timeliness and appropriateness of pain reassessment and pain management in patients
Laboratory Safety	Y_5	Monitor the Timeliness of complete blood count (CBC) as Routine Lab Results	(in hours)	To ensure the timely delivery of routine results to aid medical decision making and patients' expectations
	Y_6	The turnaround time of Troponin Lab Results	(in minutes)	To ensure the timely delivery of stat results like troponin to aid medical decision making in urgent cases
Surgical Procedures	Y_7	Completion of Surgical Invasive Procedure Consent	Percentage	To ensure compliance with and timely completion of the Surgical-Invasive Procedure Consents for patients undergoing surgery
	Y_8	Percentage of Operating Room (OR) cancellation of Elective Surgery	Percentage	To ensure efficient utilisation of the Operating Room
	Y_9	Unplanned return to OR within 48 hours	Percentage	To monitor surgical complications resulting in unplanned patients returns to the OR
Medication error use and near-misses	Y_{10}	Reported medication Error	Per 1000 prescriptions	To identify medication errors to ensure safe medication processes (ordering, dispensing and administration etc.)
Anaesthesia and Sedation Use	Y_{11}	Percentage of Completed Anaesthesia, Moderate and Deep Sedation Consent Form	Percentage	To ensure compliance with and timely completion of the Anaesthesia Consent for patients undergoing anaesthesia
	Y_{12}	Percentage of completed Modified Aldrete Scores (Pre, Post, Discharge)	Percentage	To ensure compliance with and timely completion of the Modified Aldrete Score to assess patient's recovery post sedation

	Y_{13}	Completed Pre-Anaesthesia Assessments	Percentage	To ensure compliance with and timely completion of the Pre-Anesthetic Assessments
	Y_{14}	Completion of Anaesthesia Care Plan	Percentage	To ensure compliance with and timely completion of an anaesthesia care plan
	Y_{15}	Percentage of completed Assessment of Patient who Received Anaesthesia	Percentage	To ensure compliance with and timely completion of the anaesthesia assessment for patients undergoing anaesthesia
	Y_{16}	Effective Communication of Risk, Benefit and alternatives of Anaesthesia Explained to Patients	Percentage	To explain to patients the risks, benefits and alternatives of anaesthesia for patient's informed decision making
Availability, Content and use of Patient Records	Y_{17}	Percentage of Typed Post-Operative Report Completed with 48 hours	Percentage	To ensure the completeness of medical record documentation for continuity of care
Infection Control, Surveillance and Reporting	Y_{18}	Hospital Acquired methicillin resistant staph aureus (MRSA) Rate	Per 1000 Admissions	To identify and prevent MRSA infections or colonisation in the hospital per 1000 admissions
	Y_{19}	Healthcare Associated Infection Hospital-wide	Per 1000 patient days	To identify and prevent healthcare associated infections
	Y_{20}	Surgical Site Infection Rate	Percentage	To ensure appropriate care of the surgical wound in Caesarean Section/maternity/ICU/Medical-Surgical Ward
Reporting of Activities as Required by Law and Regulation	Y_{21}	Mortality rate	Percentage	To determine the death rate in the hospital in a month
International Patient Safety Goals	Y_{22}	Monitoring Correct Site Marking	Percentage	To prevent wrong site surgery by marking the surgical site prior to the operation.
	Y_{23}	Monitoring Compliance with the Time-out Procedure	Percentage	To prevent wrong site, wrong patient surgery by conducting a surgical pause to identify the correct elements prior to the operation.

[redacted]	Y_{24}	Screening of Patient Fall Risk	Percentage	To measure compliance with screening patients for fall risk thereby preventing patient harm from falls
	Y_{25}	Overall Hospital Hand Hygiene Compliance Rate	Percentage	To measure compliance with hand hygiene practices to prevent healthcare associated infections
	Y_{26}	Patient Fall Rate	Per 1000 patient days	To ensure patient safety by minimizing the risk of fall.
	Y_{27}	Fall Risk Assessment and Reassessment	Percentage	To measure compliance with assessment and reassessment of patients for fall risk thereby preventing patient harm from falls

Source: Subashnie Devkaran, Quality Department, Al Noor Hospital

The first criterion for measure selection was that all variables must be directly linked to a JCI standard. Therefore documentation and patient care processes were implemented in these areas to comply with the standard. Second, the measures should reflect high priority areas that will affect outcomes of care. Third, the measures have a pre-defined profile which is based on: the process, procedure, or outcome to be measured; the availability of science or evidence supporting the measure; the dimension of quality that is captured by the measure, e.g. timeliness etc.; and the frequency of measurement. Fourth, all measures are applicable to all patients in the hospital and are not specific to a specialty or disease. Finally, all measures were reviewed and approved by an expert panel consisting of clinical auditors, doctors, quality and patient safety leaders. In order to ensure the accuracy of the data collected, an internal data validation process is in place within the organisation. Data validation for the selected measure set was performed when: a change was made to an existing measure such as the data collection tool; the data abstraction process or abstractor had changed; the data resulting from an existing measure had changed in an inexplicable way; the data source had changed when for example part of the patient record was turned into an electronic format and thus, the data source was now both electronic and paper; or the subject of the data collection had changed such as changes in average age of patients, co-morbidities, research protocol alterations, new practice guidelines implemented, or new technologies and treatment methodologies introduce (JCI, 2011).

The internal data validation process in place within the hospital included: re-collecting the data by second person not involved in the original data collection; using a statistically valid sample of records, cases or other data; comparing the original data with the re-collected data; calculating the accuracy by dividing the number of data elements found to be same by the total number of data elements and multiplying that total by 100. A 90% accuracy level is considered an acceptable benchmark. When the data elements differed, the reasons were noted (for example, unclear data definitions) and corrective actions were taken. A new sample was collected after all corrective actions have been implemented to ensure the actions resulted in the desired accuracy level. The sources used for the data validation included, but were not limited to: Hospital Information System (HIS); Enterprise Resource Planning (ERP) software and E-claims; Master Patient Index through diagnosis codes; the patient's medical record and other relevant data sources.

6.4 Data Analysis of the Clinical Quality Measures

6.4.1 Rationale for the choice of the study design and analytic method

Clinical healthcare interventions are difficult to measure and evaluate due to problems separating the interdependent intervention components and their specific impact on outcomes. Whilst the randomised controlled trial (RCT) is the 'gold standard' in research design, real-world clinical populations are not easily randomised and RCTs are not usually an option for outcomes-based research. In the absence of a RCT, evaluations often use quasi-experimental designs such as a pre-post study design with measurements before and after the intervention period. Pre-post studies have methodological problems, especially if there is no control group. The standard approach to detect a significant impact is to apply a *t*-test to compare the means of the pre-intervention phase with the post-intervention data. However, a *t*-test does not consider time but simply separates the data into two groups. Simple pre- and post- designs make it difficult to assess whether any differences would have occurred anyway due to a secular time trend rather than the intervention itself (Pape *et al.*, 2013). Therefore the research design adopted for this study is interrupted time series using segmented regression analysis. This design is able to account for the complexity of healthcare processes, the human variability of daily clinical practice and the difficulty of gathering adequate clinical primary data.

The raison d'être for selecting time series analysis is because quasi-experimental research designs such as interrupted time series designs are appropriate for evaluating certain types of quality interventions (Bowling, 2002, Ramsay *et al*., 2004, Wagner *et al*., 2002). Interrupted time series analysis is well suited for secondary (retrospective) data and is thus cost effective. Shadish *et al.* (2002, p.172) suggest that the interrupted time series is a 'particularly strong quasi-experimental alternative to randomised designs when the latter are not feasible and when a time series can be found'. The superior validity of this method over a simple before-and-after examination is due to the repeated measures of the same variable controlling for threats such as contemporary historical events affecting underlying trends, seasonality (provided sufficient data points are collected), secular trends, and changes in the environment (Cook and Campbell, 1979). Segmented regression analysis was developed and shown to be highly appropriate for examining the impact of interventions that constitute an experiment or quasi-experiment (e.g. policy change or accreditation) (Wagner *et al*., 2002). The effects produced by interventions differ both in the onset (abrupt or gradual) and duration (permanent or temporary).

In this study, two parameters were used to define each segment of the time series: level and trend. The level is the value of the series at the beginning of a given time interval (i.e. the Y intercept for the first segment, and the value immediately following a change point or intervention). The trend is the rate of change of a variable (the slope) during a segment. Each segment of the series exhibits both a level and a trend. A change in level, e.g. an increase or decrease in the quality measure outcome after the accreditation, constitutes an abrupt intervention effect. A change in trend will be defined by an increase or decrease in the slope of the segment after the accreditation as compared with the segment preceding the accreditation. A change in trend represents a gradual change in the value of the outcome during the segment. Segmented regression analysis enables identification of the level and trend in the pre-accreditation (pre-intervention) segment and changes in level and trend after accreditation (or intervention).

In order to conduct segmented regression analysis, the literature makes a general recommendation for 12 data points before and 12 data points after the intervention, so that seasonal variation may be estimated (NHS, 2008). This examination uses 48 data points (12 months before and 36 months after).

The design was chosen for this study for the following reasons:

1. Feasibility. The outcome measures comprise of data routinely collected by the Quality Department of the hospital. This information has been collected since mid-2008.
2. Interrupted time series (ITS) analysis allows the researcher to assess and quantify whether and by how much accreditation changed the clinical measures, and if the change was short-lived or sustained. This is particularly relevant in accreditation where the benefits of accreditation may emerge long after the survey.
3. The advantages of this form of statistical analysis over other modelling such as simple linear regression and autoregressive integrated moving average models include:
    a. Even without a control group some threats to internal validity are addressed by making multiple assessments over time pre- and post-intervention.
    b. The results of the separate linear regressions can be displayed on the time series plot alongside the time series.
    c. This form of analysis only requires a minimum of 12 data points pre- and post-intervention, whereas other more complex modelling (e.g. autoregressive integrated moving average models) requires over 100 data points.

6.4.2 The objectives of time-series analysis

The main objectives of time-series analysis are:

(a) *Description*. To describe the data using summary statistics and graphical methods. A time plot of the data will be constructed to plot the observations against time in order to reveal important features of the data such as trend, seasonality, outliers, smooth changes in structure, turning points and/or sudden discontinuities, which are vital, both in analysing the data and calibrating a model (Chatfield, 2000). The time plot will identify the following:

(1) *Seasonal variation*. This type of variation is generally an annual cycle.

(2) *Trend*. A trend is present when a series exhibits a sustained increase or decline, over several successive time periods. The trend is the rate of change of a measure (the slope) during a segment. A change in trend (i.e. an increase or

decrease in the slope of the segment) after accreditation is compared with the segment preceding accreditation.

(3) *Other cyclic variation*. This includes regular cyclic variation at periods other than those described above.

(4) *Irregular fluctuations*. This will be used to describe any variation remaining after trend, seasonality and other systematic effects have been removed.

(5) *The level*. This is the value of the series at the beginning of a given time interval (i.e. the *Y*-intercept for the first segment and the value immediately following each change point at which successive segments join). A change in level, e.g. a jump or drop in the outcome after the intervention, constitutes an abrupt intervention effect (Wagner *et al.*, 2002).

(b) *Modelling*. Segmented regression models fit a least squares regression line to each segment of the independent variable, time, and thus assume a linear relationship between time and the outcome within each segment (Wagner *et al.*, 2002). For example the following linear regression model is specified to estimate the level and trend in the dependent variable before accreditation and the changes in level and trend following accreditation.

$$\boxed{Y_t = \beta_0 + \beta_1 * \text{time}_t + \beta_2 * \text{intervention}_t + \beta_3 * \text{time after intervention}_t + e_t \quad (1)}$$

Equation 6.1

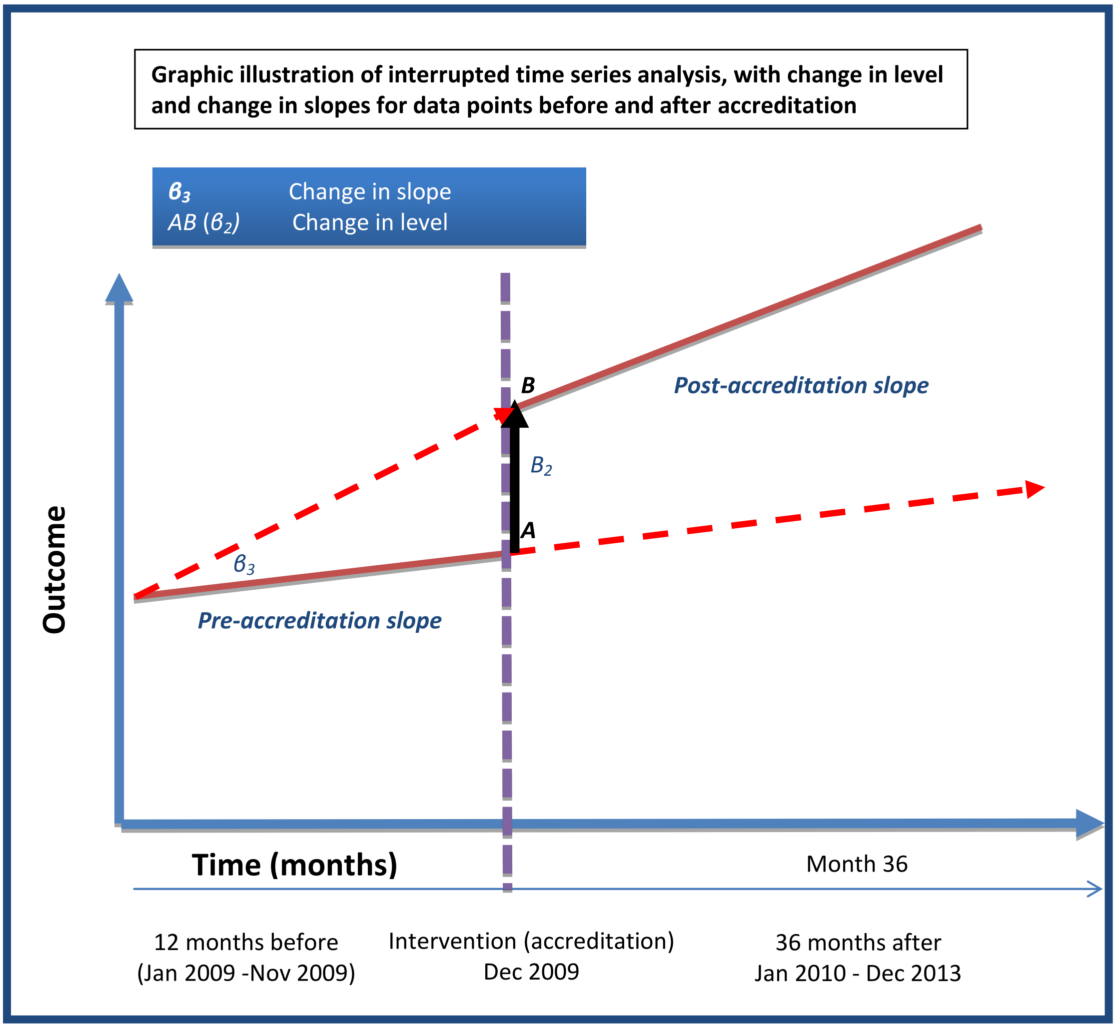
Here, Y_t is the outcome or, for example, the mean number of physicians complying with site marking per month; *t* is a continuous variable indicating time in months at $time_t$ from the start of the observation period to the last time point in series; *intervention* is a measure for $time_t$ and designated as a dummy variable taking the values 0 occurring before intervention or 1 after the intervention (accreditation), which was implemented at month 12 in the series. A *time after intervention* is a continuous variable counting the number of months after the intervention at $time_t$, coded 0 before the accreditation and (time-36) after the accreditation. In this model:

- β_0 estimates the baseline level of the outcome at the beginning of the series, e.g. mean number of physicians complying with site marking per month at time zero;

- β_1 is the slope prior to accreditation and estimates the change in mean number of physicians complying with site marking that occurs with each month in the pre-accreditation segment (i.e. the baseline trend);
- β_2 is the change in level immediately after the accreditation and estimates the change in mean number of physicians complying with site marking per month immediately after the intervention, that is, from the end of the preceding segment; and
- β_3 is the change in the slope from pre to post-accreditation and represents the monthly mean of the outcome variable. In this example it estimates the change in the trend in the mean number of physicians complying with site marking per month after the accreditation, compared with the monthly trend before the accreditation. The sum of β_1 and β_3 is the post-intervention slope. Using Model 1 to estimate level and trend changes associated with the intervention, we control for baseline level and trend, a major strength of segmented regression analysis.
- The error term e_t at time $_t$ represents the random variability not explained by the model. It consists of a normally distributed random error and an error term at time $_t$ that may be correlated with errors at preceding or subsequent time points.

The results of segmented regression modelling will be reported as level and trend changes and a comparison of the estimated post-intervention values of the outcome to values estimated at that time but based on baseline level and trend only, as if the intervention had not occurred (the counterfactual value). The intervention effect will be expressed as the absolute difference between the predicted outcome based on the intervention and the counterfactual value, or as the ratio of the predicted to the counterfactual value (usually expressed as a percentage increase or decrease). Change in level (*AB* in Figure 6.1) is the size of the immediate intervention effect, and β_3 is the change in slope representing the extension of the intervention effect.

Figure 6.1 Graphic illustration of time series analysis



Three outcomes in the interrupted time series analysis are:

1. The change in level immediately after the intervention (accreditation);
2. The difference between pre-intervention (pre-accreditation) and post-intervention (post-accreditation) slopes and;
3. The estimation of monthly average intervention effect after the intervention.

6.4.3 *The characteristics of time series analysis*

There are three particular characteristics of time-series— auto-correlation, non-stationarity, and seasonality which may lead to biased results (Lagarde, 2011). The solutions to these problems are outlined below.

6.4.3.1 Autocorrelation in time series

First, autocorrelation is a distinguishing feature of time series data and occurs when the data values at one point in time are statistically correlated with past values. Therefore, the series does not exhibit random fluctuation from one time point to the next. This serial dependency is termed autocorrelation. In a monthly time series for example, the magnitude of an outcome variable in a given month may be correlated with each of the neighbouring months. Correlation between adjacent data points is termed first-order correlation; correlation between the current point and two months before or after is second-order autocorrelation, and so on (Wagner *et al*., 2002). There can be a major problem with the conventional ordinary least squares (OLS) linear regression approach in the presence of autocorrelation. Autocorrelation, if present, violates the critical OLS assumption of independence whereby the magnitude of correlation between errors over time should be zero. The consequence of this violation of the independence assumption is that the variance estimates obtained from an OLS regression model are biased and *ipso facto* so are the tests of statistical significance. Positive autocorrelation decreases the apparent variability in the data resulting in lower standard errors, and negative autocorrelation increases the apparent variability resulting in higher standard errors. Thus, in the presence of autocorrelation, OLS estimation is not an appropriate estimation procedure for conducting interrupted time series analysis, as it can lead to incorrect inferences concerning the statistical significance of coefficients. This bias tends to be in the direction of under-estimating standard errors with the result that the corresponding P-values are too liberal (i.e. we are more likely to falsely reject the null hypothesis). Therefore, when analysing the impact of an intervention on a time series there is possibility of making either a Type one error, rejecting a null hypothesis that is in fact true, or a Type two error, failing to reject a null hypothesis that is in fact false.

Positive correlation exists when consecutive residuals lie on the same side of the regression line; negative autocorrelation exists when consecutive residuals tend to lie on the different sides of the regression line. A recognised statistical test for the presence of first-order autocorrelation is the Durbin-Watson statistic. The key features of this test statistic are that in the presence of positive autocorrelation it tends to be small, while in the presence of negative autocorrelation the value of the test statistic will be large. If the statistic is significant, the model is adjusted by estimating the autocorrelation parameter and including it in the segmented regression model. If no autocorrelation is present, then an OLS based intervention model will be appropriate for the analysis. It is essential to note that the critical values for the Durbin-Watson test are dependent on the number of parameters contained in the model from which the residuals were derived (Ostrom, 1990; Mendenhall and Sincich, 1993). In this research the issue of autocorrelation was assessed by the Box and Jenkins (1976) approach to statistical analysis for time series using three steps: 1) Identification 2) Estimation and 3) Diagnosis.

1) Identification

In the first step of identification the order of the Autoregressive (AR) and Moving Average (MA) process in the series is determined. Autocorrelation Functions (ACFs) and Partial Autocorrelation Functions (PACFs) are examined for the presence of autocorrelation, trend, stationarity and seasonality in the series. ACF is a simple and unconditional correlation between a time series data point and its lags. Correlograms are used as a graphical representation of the degree of correlation which exists between errors across successive time lags. ACF and PACF plots are two types of correlograms that are of particular importance. Visual examination of ACF and PACF plots are used to describe and identify the series and prediction of the model. If an autocorrelation at some lag is significantly different from zero, the correlation is included in the model and if the condition applies to partial autocorrelation it will be included too. When series are found to be stationary, the plots are re-examined to distinguish the AR and MA in the series. If this is the case, the order of AR and MA is identified (McDowall *et al.*, 1980).

In addition to examining the ACF and PACF plots, there are also a number of formal statistical tests to identify autocorrelation in the series. The Durbin-Watson (DW) statistical test is used in this study. Under the null hypothesis of no autocorrelation (P $\leq$0), DW is equal to or around 2. A test statistic below 2 suggests positive autocorrelation (P > 0), while a test statistic above 2 suggests negative autocorrelation. There are two other critical values which allow a degree of uncertainty in testing the hypothesis; a smaller value DWL and a larger value DWH. In this study the critical values are from 1.38 to 2.62 according to the degrees of freedom. In the case of positive serial autocorrelation, when the Durbin-Watson test statistic is less than the critical value DWL, the null hypothesis can be rejected and we can conclude that there is significant first order correlation. When the Durbin-Watson test statistic is greater in magnitude than the higher critical value DWH, it may be concluded that the null hypothesis has not been rejected and that there is no (positive) first order autocorrelation which needs to be controlled statistically. If DW lies between DWL and DWH, the test is inconclusive; in that case, alternative tests for autocorrelation should be considered. Although less common than positive autocorrelation, negative autocorrelation can also be detected using the Durbin-Watson statistic.

Two distinct types of autocorrelation are identified: 1) autoregressive process and 2) moving average process. In an autoregressive process, the ACF plot dampens out relatively quickly while the PACF plot has large spikes at lag points with near zero spikes at subsequent lags. The order of the autoregressive process, *p*, is defined by a number of large spikes. For example, an AR process of order 2 has two large spikes in PACF. In contrast, a Moving Average (MA) process is identified by a PACF plot which dampens quickly or relatively quickly and an ACF plot with large spikes at lag order q. It is also important to consider the extent of autocorrelation provided by AR and MA models. In both processes the limits of autocorrelation must meet bounds within -1 and +1 limits.

2) <u>Estimation</u>

The second step is estimation, where the analyst uses a series of statistical tests to estimate the individual parameters of the identified model. The number of coefficients describing the model corresponds exactly to the order of the model. The order of autoregressive, moving average and their effects are tested against the null hypothesis of zero.

3) <u>Diagnosis</u>

The third step is diagnosis, where tests are performed to check whether the selected model is really a statistically sufficient description of the time series. Residuals are examined to detect patterns in the data that are still not accounted for. This includes examination of the residuals from the model using ACF and PACF plots. Residual scores are the difference between the values predicted by the model and the actual values. Provided that all autocorrelations are captured by the model, the residuals plot should demonstrate a pure random process. In time series analysis, power depends on the accuracy of the model. In addition to other outputs of a fitted model, there are two criteria to measure goodness-of-fit. First, the Akaike Information Criterion (AIC) is a measure of goodness of fit for an estimated model. It is often used in model selection.

Smaller values of the AIC are preferred. For example, you can choose the length of a lag distribution by choosing the specification with the lowest value of the AIC. Second, the Schwarz Bayesian Criterion (SBC) is an alternative to the AIC that imposes a larger penalty for additional coefficients. The ratio of AIC to SBC should be close to one (Asteriou and Hall, 2007). To assess the fit of the final model, we have visually examined residuals around the predicted regression lines. Residuals that are normally distributed and that follow no observable pattern over time indicate that the assumptions underlying the linear model are met (Wagner *et al*., 2002).

6.4.3.2 Non-stationarity

Secondly, in order to establish whether a given time series displays autocorrelation, it is necessary to first render that series stationary. Non-stationarity relates to the data exhibiting one or more natural trends, implying that the mean value and variance of the data series can change over time for reasons exclusive of the effect of the intervention (Chatfield, 1989). A stationary series is one which has been transformed such that it has both a constant mean level and a constant variance (Asteriou and Hall, 2007). Under this assumption, we can use the replication over time in a time series to make inferences about the common mean, variance and other statistics. When a series is not stationary it contains unit roots (Zeger *et al*., 2006). Series containing such unit roots are classified as difference stationary (Rehm and Gmel, 2001). Series with trend and without a unit root are classified as trend stationary and can be analysed using generalised regression methods. Obtaining a constant mean level of a series is achieved by removing any apparent trend component contained in this series. There are two general approaches to achieving this: (1) differencing the series by subtracting from each time point t, the value of the previous time point *t-1* or (2) de-trending the series using a regression approach and working with the model residuals.

The Dickey-Fuller (Dickey and Fuller, 1979) test for stationarity is simply the normal *t*-test on coefficients of lagged dependent variable *Y*t-1. This test does not have a conventional *t* distribution and so the critical values by Dickey and Fuller are used. This test is limited when a series contains a major break such as change in level or slope. Another limitation is when the null hypothesis of a unit root is rejected it does not necessarily mean that the error term is a result of a white noise; it may be affected by autocorrelation (Asteriou and Hall, 2007). Since the error term is unlikely to be the white noise, Dickey and Fuller extended their test procedure suggesting an augmented version of the test which includes extra lag terms of the dependent variable in order to eliminate autocorrelation. The lag length of those extra terms is either determined by the Akaike Information Criterion (AIC) or Schwartz Bayesian Criterion (SBC), or more usually by the lag length necessary to dampen the residuals (Asteriou and Hall, 2007). The Augmented Dickey-Fuller test (ADF) includes extra lag terms of the dependent variable in regression to eliminate autocorrelation in detecting white noise. Thus the ADF test was used in this study.

6.4.3.3 Seasonality in time series

Finally, seasonality results in regular (expected) changes in the outcome due to seasonal variation. For example, influenza outbreaks are likely to peak during the winter season then decline afterwards. Seasonality needs to be controlled because it provides an indication of the reason for variability in the time series data. In addition, since the pre-accreditation and post-accreditation time periods contain different seasonal profiles (e.g. more summer months in the post-accreditation period), this seasonality could potentially distort the actual effect of an intervention (Lagarde, 2011). In order to detect seasonality, at least 24 monthly data points are required. Seasonality and stationarity are linked, because a different indication of seasonality is to analyse whether the data series is stationary, or has a constant mean over time. Therefore, the variance of the outcome is constant over time, and the covariance between the outcome at different time periods must match. If the series has seasonality or some other non-stationary pattern, the usual solution is to take the difference of the series from one period to the next and then analyse this differenced series. Sometimes a series may need to be differenced more than once or differenced at lags greater than one period (Carroll, 2010). In order for seasonal autocorrelation terms to be identified and estimated, it is necessary that the series does not contain a seasonal unit root. Formal statistical testing for the presence of unit roots in time series was conducted using the Dickey-Fuller Test (Dickey and Fuller 1979). This test compares the relative importance of stochastic and deterministic trend components in a given time series. The null hypothesis is that tau is not stationary. The series is stationary/no seasonality if $P \leq 0.05$.

6.4.4 Steps in time series analysis

In general, two main methods are used for interrupted time series analyses. The first being segmented regression analysis (described earlier) and the second is Autoregressive Integrated Moving Average (ARIMA) models.

6.4.4.1 Autoregressive Integrated Moving Average (ARIMA) models

In time series analysis, an autoregressive integrated moving average (ARIMA) model is a simplification of an autoregressive moving average (ARMA) model. These models are fitted to time series data either to better understand the data or to predict future points in the series (forecasting). In particular cases, they are employed when data display evidence of non-stationarity, where an initial differencing step can be applied to remove the non-stationarity. The model is generally referred to as an ARIMA(p,d,q) model where p, d, and q are non-negative integers that refer to the order of the autoregressive, integrated, and moving average parts of the model respectively. ARIMA models form an important part of the Box-Jenkins approach to time-series modelling. When one of the three terms is zero, it is usual to drop 'AR', 'I' or 'MA'. For example, ARIMA(0,1,0) is I(1), and ARIMA(0,0,1) is MA(1) (Mills, 1990).

The empirical model-building approach of ARIMA analysis means such time series models routinely have R^2 values (a measure of the goodness of fit) over 0.5, indicating acceptable model fit. ARIMA methods are capable of modelling complex seasonal patterns in a time series, particularly when such seasonality has a stochastic component. Indeed, ARIMA methods should not be used with series that has been adjusted to remove the seasonal component, as the non-seasonal and seasonal components of the model are best estimated simultaneously (Enders, 2009). The empirical ARIMA approach to modelling seasonality requires fewer terms to account for seasonality, with perhaps only one extra degree of freedom being required, which is an advantage of the ARIMA approach over segmented regression for modelling time series with a seasonal component. However, ARIMA models can only be fitted in series with 100 data points or more (Yaffee and McGee, 2000). Hence, it was not applicable in this study. The preferred method of analysis was segmented regression analysis.

The following process was undertaken in the analysis of the time series in this thesis (Donnelly, 2005):

6.4.4.2 Preliminary steps

Data cleaning and checking was conducted to ensure that there were no missing values etc. In this study there were no missing values[2]. The data were checked for outliers in the data series which may have been caused by errors in measurement or an unknown event. Outliers have the same impact on analysis as that of missing data. Similarly, this study had no obvious outliers in the series, although outliers can be treated in the same way as missing data and replaced using a suitable imputation method.

Temporal aggregation of the data collection was reviewed. This arises when the frequency of data generation is lower than that of data collection. In this study, the introduction of accreditation is expected to have an effect on a series for the duration of just a few months. Hence, if data were collected yearly, it may fail to detect the temporary effect of the intervention. The data were collected monthly and thus did not demonstrate temporal aggregation.

The length of the data series was assessed, although there are no conventional tenets defining the number of data points needed for time series analysis, and power calculation is difficult. On the basis of the reported simulation results, these models have more than 80% power to detect effect sizes of 1.0 or greater in a range of situations with 24 or more time points, depending on the degree of autocorrelation and whether a level change, trend change, or both are estimated (Zang *et al*., 2011). A minimum of 24 months is recommended to span enough seasons to enable detection and modelling of the seasonal patterns (Yaffee and McGee, 2000). This thesis uses a 48 month time series from the period January 2009 to December 2012.

Threats to internal and external data validity were reviewed. The methods of data collection should be consistent over time. If changes in data collection tools used to

[2]). Ignoring the time points with missing data and analysing the shorter series will also produce inaccurate estimates of the serial dependence present in a series. A more desirable approach is to impute maximum likelihood estimates for the missing data, which has been shown to produce accurate estimates of the autocorrelation present in a series even when 40% of data points are missing (Velicer and Colby, 2005).

observe the outcome variable coincided with the introduction of the intervention, the change in the data series may erroneously appear to be the effect of the intervention. In this thesis, both the data collection tools and the methods of data collection remained constant.

The research population should remain the same throughout the study period. As mentioned earlier, there were no changes in the demographic composition or service delivery during the period of study. Hence the observations at each time point are directly comparable. Furthermore, the quality measure definitions remained the same thus ensuring that the denominator population each month and the structure of the population, with respect to patient characteristics such as age and diagnosis, did not vary from one month to the next.

The impact of external or internal events was reviewed. When assessing the impact of an intervention on a time series it is important that any observed changes in a series can be attributed to the effect of that intervention only and not to other interventions or events which have had an effect on the series at the same time. There were no major organisational changes in structure or management during the period of study. Neither were there significant legislative or regulatory changes in the Abu Dhabi environment.
The data were then divided into the pre-intervention and post-intervention series and coded as dummy variables (0 as pre-accreditation and 1 as post-accreditation) (Table 6.2).

Table 6.2 Example of raw data coding

Percentage of Completion of Surgical Invasive Procedure Consents

Month	Actual	Time	Intervention	Time_Aft_Int
Jan-09	47.87	1	0	0
Feb-09	92.22	2	0	0
Mar-09	94.79	3	0	0
Apr-09	93.42	4	0	0
May-09	98.41	5	0	0
Jun-09	98.99	6	0	0
Jul-09	98.53	7	0	0
Aug-09	96.88	8	0	0
Sep-09	96.83	9	0	0
Oct-09	100.00	10	0	0
Nov-09	100.00	11	0	0
Dec-09	98.58	12	1	1
Jan-10	99.41	13	1	2
Feb-10	98.18	14	1	3
Mar-10	95.56	15	1	4
Apr-10	95.56	16	1	5
May-10	97.47	17	1	6
Jun-10	97.58	18	1	7
Jul-10	91.88	19	1	8
Aug-10	94.08	20	1	9
Sep-10	100.00	21	1	10
Oct-10	99.21	22	1	11
Nov-10	99.46	23	1	12
Dec-10	100.00	24	1	13
Jan-11	100.00	25	1	14
Feb-11	98.86	26	1	15
Mar-11	100.00	27	1	16
Apr-11	100.00	28	1	17
May-11	100.00	29	1	18
Jun-11	100.00	30	1	19
Jul-11	100.00	31	1	20
Aug-11	100.00	32	1	21
Sep-11	100.00	33	1	22
Oct-11	100.00	34	1	23
Nov-11	98.87	35	1	24
Dec-11	100.00	36	1	25
Jan-12	98.81	37	1	26

Feb-12	100.00	38	1	27
Mar-12	100.00	39	1	28
Apr-12	98.84	40	1	29
May-12	100.00	41	1	30
Jun-12	98.79	42	1	31
Jul-12	99.48	43	1	32
Aug-12	99.40	44	1	33
Sep-12	100.00	45	1	34
Oct-12	100.00	46	1	35
Nov-12	100.00	47	1	36
Dec-12	100.00	48	1	37

6.4.4.3 Visual examination of the time plot of the series of the various key performance measures or quality measures

Prior to visual examination of the time plot, the pre-intervention series needs to be identified and the intervention demarcated at a single known point in time, allowing the separation of the pre and post intervention series. The time series chart was examined to detect the possible presence of the underlying trends prior to the intervention, seasonal fluctuations, and changes in the variability of the outcome variable over time. Depending on the outcome of the above, various analyses were conducted on the particular characteristics of the series. For example, where a sharp change in the level of the series at, or shortly after, the onset of the intervention was apparent before the ITS modelling was conducted, the subsequent modelling was computed to confirm whether this change was statistically significant and also to quantify the magnitude of such a change. Furthermore, during the examination of the time plot, outlier time points, which may have the potential to bias the regression estimates, were noted.

6.4.4.4 Check for autocorrelation

The Box and Jenkins (1976) approach to statistical analysis (described earlier) for auto-correlated series time series was used in this study.

6.4.4.5 Establish whether the series exhibits trends, seasonality or stationarity

Unit root testing was computed using the Dickey-Fuller statistic. In cases where the null hypothesis of a unit root was rejected under this model, it was assumed that the series did not require differencing. Where the null hypothesis of a unit root is not rejected, then further analysis was done before concluding that differencing is required.

6.4.4.6 Fit intervention models controlling for any autocorrelation

If the series does not contain a unit root (i.e. the trend is stationary), then regression models incorporating autocorrelated errors were calibrated. In the segmented regression models, models were fitted containing the underlying trend, change in level and change in trend terms. The AR and MA modelling process is described below.

The Autoregressive Process

As a concept, the autoregressive process is one with a 'memory', in that each observation is correlated with all preceding observations. Most time series consist of elements that are serially dependent on the consecutive element or coefficients called an autoregressive process. In this process a coefficient(s) describes the consecutive elements. Each constituent is made up of a random error component and a linear combination of prior observations. One approach to autocorrelation is the autoregressive process. In an AR (1) process, the current observation is a function of the preceding observation, which is a function of the one preceding it, and so on. Autoregressive process of order P for a stationary time series Y is theorised in the following equation (McDowall, 1980)

$$Yt = C + \Phi Yt\text{-}1 + \Phi Y\ t\text{-}p + \ldots + \Phi pY\ t\text{-}P + at \qquad \text{Equation 6.2}$$

In which the value of Y at a given time has a constant C, a random error component of at and the components of Y values at a previous lag with the order of P.

The Moving Average Process

The difference between an autoregressive process and a moving average process is that each value in a moving-average series is a weighted average of the most recent random errors, while each value in an autoregressive process is a weighted average of the recent values of the series. Therefore the moving average component is the 'memory' of the process for the preceding random shock. In order to eliminate noise of individual observations in time series analysis, we can average a number of observations around time *t* to obtain the central tendency. The moving average cancels positive and negative shocks. If *X*t denotes the level of the series at time *t*, the moving average *M*t is defined as:

$$Mt = \frac{1}{F+L+1} \sum_{i=-L}^{i=F} Xt + i \qquad \text{Equation 6-3}$$

where *L* denotes the number of lagged terms to be included in the average and *F* denotes the number of leading terms to include (McDowall *et al.,* 1980). The number of lagged terms depends on the periodicity of data. Commonly the number of terms chosen to include in a moving average is the number of time periods in a year. For quarterly data four terms are used, and for monthly data twelve terms are used. Nonetheless a four-period moving average cannot smooth out fluctuations that occur over an entire year. On the other hand, a twelve-period moving average is based on data that span an entire year, resulting in an average that is not influenced by seasonal factors. The number of available observations is also important: with a low number of data points we tend to use lower a MA process to avoid having too few data points in final analysis. When q is 1, there is a relationship between the current time point and the random shock at lag 1. It is also possible that each element in the series is dependent on past error terms, which cannot be accounted for in the autoregressive process. In other words each time point is made up of a random error component (random shock) and a linear combination of prior error components (random shocks). The MA process equation can be inverted to AR process, a duality between MA and AR.1. This can happen when the MA parameters follows a process called invertibility; otherwise the series is not stationary. If *q* is the order of moving average process:

$$Yt = C + \theta 1Yt\text{-}1 + ... + \theta qY\ t\text{-}q \quad \text{Equation 6.4}$$

Therefore the below equation relates to a first order MA process:

$$Yt = C + \theta Yt\text{-}1 \quad \text{Equation 6.5}$$

For a first order moving average process the coefficients, θ, must be between -1 and 1 and for second order it must meet the following condition θ1 θ2 < 1. These are called bounds of invertibility (McDowall *et al.*, 1980).

6.4.4.7 Examine residuals from obtained models and assess validity

Once a parsimonious ITS model is established, the next stage is to assess its validity through the analysis of the model residuals. A time plot of the residuals is examined. A random distribution indicates no obvious temporal patterns. Time-points with large residuals are further investigated to determine why it was not sufficiently explained by the model. Other events that could explain the deviations from the model are identified, thus improving the model fit by adding pulse terms for these events.

6.4.4.8 Incorporate seasonal influences in models where required

Because seasonality induces autoregressive and moving average processes, detection and inclusion of a seasonal component is implemented in time series analysis methods using ARIMA, ARMA, and dynamic regression (described earlier).

6.4.4.9 Check for collinearity

Collinearity results from a predictor variable being highly correlated with another predictor variable. The regression estimates, variance estimates, the test statistics and the P values may be biased in the presence of collinearity. An approach to test the collinearity is regressing predictor variables with one another using the Variance Inflation Factor test. The literature recommends that any Variance Inflation Factor greater than 10 in magnitude warrants further investigation due to a potentially serious collinearity problem (Belsley *et al*., 1980).

6.4.4.10 Check for a Non-linear trend

It is possible that while the data do not contain a unit root, the nature of the trend is not linear, for example increasing or decreasing in a quadratic character. In this case applying a linear trend term to the model will be misleading. One approach is applying polynomial terms where appropriate.

The summary of building the segmented regression model is denoted below.

1. Visual inspection of the data.
2. Autocorrelation check was conducted using Durbin Watson Statistics.
3. Test for seasonality/stationarity was performed-using the ADF unit root test. Visual inspection of ACF and PACF correllograms to review AR or MA.
4. Goodness-of-fit tests were undertaken using F-statistics to test for significance of the overall model.
5. Parameter estimation was computed to identify significant individual regressors in the model.
6. Model comparison- (uncorrected model vs. corrected model). Examine the residuals, and other tests for model comparison.
7. Test the plausibility of alternative models and assess the relevant test results and outputs.

6.5 Results of the time series analysis

6.5.1 Patient Assessment measures (Table 6.3)

The segmented regression equations of the time series before and after accreditation for the dependent variables of Percentage of Initial Medical Assessment done within 24 hr. of admission ***(Y_1)***, Percentage of Initial Nursing Assessment within 24 hr. of admission ***(Y_2)***, Pain Assessments Completed per month ***(Y_3)***, and Percentage of Completed Pain Reassessments ***(Y_4)***, show that accreditation did not have a significant positive impact on the assessment quality measures of ***Y_1***, ***Y_2*** and ***Y_3***. Hospitals are mandated to publish a four-month track record of compliance prior or accreditation (Joint Commission International, 2010) and thus the results may be influenced in part by the high compliance with the standard prior to the accreditation survey. Furthermore, only one of the measures (percentage of completed pain reassessments) had a significant decrease in the slope post accreditation survey. It also recorded a significant pre-accreditation slope.

6.5.2 Laboratory Safety Measures (Table 6.3)

The outcome of analysis for the segmented regression analysis for Timeliness of CBC as a Routine Lab Results (in hours) ***(Y_5)*** and turnaround time of Troponin Lab Results (minutes) ***(Y_6)*** demonstrated different results. The increase in $\boldsymbol{Y_5}$ measure (turnaround time) immediately post- accreditation was not significant but had a significant positive change in the slope (P≤0.0001) pre-accreditation and post-accreditation. Conversely, the $\boldsymbol{Y_6}$ measure (turnaround time) decreased immediately post- accreditation survey with a significant negative change in slope (P≤0.0001). The positive $\boldsymbol{Y_6}$ measure results may be explained by the demand for the laboratory results by the Emergency Department, a process independent from accreditation. In addition, the implementation of a clinical pathway on Acute Myocardial Infarction requires the laboratory to improve the turnaround time for Troponin as it is an important decision making tool for clinicians.

Table 6.3 Patient assessment and laboratory safety measures

Model Validation and Parameter Estimation										Diagnostic tests			
MODEL: QPS 1 Patient Assessment	Intercept		Time(β_1)		Intervention (β_2) (Change in Level)		Tim_Aft_Int (β_3) (Change in Slope)		R^2	Autocorrelation (AC) Check: Durbin Watson		Test for Seasonality/ Stationarity (Dickey Fuller Unit Root Test)	
	Value	p-value	Value	p-value	Coefficient-95% confidence interval (LCI-UCI)	P-value	Coefficient-95% Confidence interval (LCI-UCI)	P-value	R^2	D-Value (before)	D-Value (after)	P-value	Result
(Y_1) with AR1	78.60	0.00*	1.19	0.35	-4.54 (-16.33 to 7.25)	0.44	-0.99(-3.63 to 1.65)	0.45	0.38	1.00	1.92	0.03	No Seasonality
(Y_2)	96.17	0.00*	0.13	0.53	1.24 (-1.63 to 4.11)	0.38	-0.18 (-0.60 to 0.24)	0.39	0.09	1.46	No AC	0.00	No Seasonality
(Y_3) with AR1	94.56	0.00*	0.16	0.85	-4.00 (-12.10 to 4.10)	0.33	-0.02 (-1.82 to 1.77)	0.98	0.34	1.05	2.22	0.04	No Seasonality
(Y_4)	32.56	0.00*	7.02	0.00*	-13.91 (-32.37 to 4.56)	0.14	-7.28 (-10.00 to -4.56)	0.00*	0.48	1.72	No AC	0.00	No Seasonality
QPS 2. Laboratory Safety													
(Y_5) with AR1 (in hours)	7.06	0.00*	-0.36	0.00*	0.34(0.13, 0.54)	0.52	0.34(0.04, 0.64)	0.00*	0.73	1.31	2.11	0.04	No Seasonality
(Y_6) after differencing (in minutes)	47.58	0.00*	0.15	0.46	-0.43(-2.99, 2.13)	0.74	-0.60(-1.02, -0.18)	0.01*	0.90	1.85	No AC	0.95	Data is not stationary

6.5.3 Surgical Procedures (Table 6.4)

There is a significant change in the level of the $\boldsymbol{Y_7}$ measure (surgical procedure consent) after accreditation ($P \leq 0.01$) followed by a significant decrease in slope. The results may be attributed to the relatively high pre-accreditation performance. Conversely, accreditation had no significant impact on the operating room measures $\boldsymbol{Y_8}$ (percentage cancellations of elective surgery) and $\boldsymbol{Y_9}$ (percentage return in OR within 48 hours). JCI has no standards that relate specifically to the operating room processes like cancellation etc.

6.5.4 Reported medication errors (Table 6.4)

The results demonstrate that immediately following the accreditation survey, the level of reported medication errors per 1000 prescriptions ($\boldsymbol{Y_{10}}$) dropped significantly ($P \leq 0.001$), but there was no significant change in the slope after the intervention. A quality improvement project to reduce the number of medication errors had been implemented in September 2009 (3 months before the survey). Moreover, the JCI survey has a comprehensive approach (medication system tracer) to evaluation which may have led to the significant improvement. However, this improvement was not sustained.

Table 6.4 Surgical procedures and reported medication errors

Model Validation and Parameter Estimation										Diagnostic tests			
MODEL QPS 3.4 Surgical procedures	Intercept		Time(β_1)		Intervention (β_2) (Change in Level)		Tim_Aft_Int (β_3) (Change in Slope)		R^2	Autocorrelation (AC) Check Durbin Watson		Test for Seasonality/ Stationarity (Dickey Fuller Unit Root Test)	
	Value	P-value	Value	P-value	Coefficient 95%Confidence Interval (LCI, UCI)	P-value	Coefficient 95%Confidence Interval (LCI, UCI)	P-value		D-Value (before)	D-Value (after)	P-value	Result
(Y_7) with MA1	87.91	0.00*	1.21	0.00*	-2.70(-4.76, -0.63)	0.01*	-1.18(-1.72, -0.64)	0.01*	0.96	1.30	2.53	0.00	No Seasonality
(Y_8)	14.89	0.00*	-0.28	0.38	-0.36(-4.66, 3.95)	0.87	0.32(-0.31, 0.95)	0.31	0.49	2.10	No AC	0.00	No Seasonality
(Y_9)	0.08	0.5	0.003	0.88	-0.05(-0.30, 0.20)	0.69	0.01(-0.03, 0.04)	0.63	0.34	1.86	No AC	0.00	No Seasonality
QPS 3.6 Reported Medication errors													
Y_{10}	0.03	0.03*	0.002	0.21	-0.04(-0.06, -0.01)	0.00*	-0.00(-0.01, 0.00)	0.18	0.35	1.56	No AC	0.00	No Seasonality

6.5.5 Anaesthesia and Sedation Measures (Table 6.5)

The accreditation survey was followed by a negative change in level for five out of six measures, anaesthesia and sedation measures ($Y_{11}, Y_{12}, Y_{14}, Y_{15}$ and Y_{16}), excluding Y_{13}, of which four ($Y_{11}, Y_{12}, Y_{14},$ and Y_{16}) were significant ($P \leq 0.01$). Similarly, all six anaesthesia measures demonstrated a negative change in slope post-survey of which four ($Y_{11}, Y_{12}, Y_{14},$ and Y_{16}) were significant ($P \leq 0.01$). The negative change in the post-accreditation slope is mainly due to staff not sustaining the improvement, as there was no incentive to do so due to the three -year survey cycle.

6.5.6 Completion of the Typed Post-Operative Note within 48 Hours (Table 6.6)

The results demonstrate an increase in the level of Y_{17} measure but this was not significant. Conversely, the negative post-accreditation slope is significant ($P \leq 0.01$). These results reveal that improvement was not sustained after accreditation, which may be due to the relatively high existing compliance.

6.5.7 The infection control measures (Table 6.6)

Following the accreditation survey, the level of two out of the three infection control measures increased (excluding Y_{20}) of which Y_{18} was significant ($P \leq 0.05$). However all three measures exhibit an increase in the slope post- survey of which Y_{18} is significant ($P \leq 0.05$). This may be partly attributed to a more developed infection control programme and surveillance process after the survey, thus resulting in the identification of more infections.

6.5.8 Mortality Rate (Table 6.6)

None of the coefficients for mortality rate Y_{21} is significant. This is largely due to the fact that the JCI standards are more process and structure oriented and thus would not impact on outcome measures. The standards do not address clinical care at a physician or practice level.

Table 6.5 Anaesthesia and sedation use measures

Model Validation and Parameter Estimation											Diagnostic tests			
MODEL: QPS 3.7 Anaesthesia and Sedation Use	Intercept		Time(β_1)		Intervention (β_2) (Change in Level)		Tim_Aft_Int (β_3) (Change in Slope)		R^2		Autocorrelation (AC) Check Durbin Watson		Test for Seasonality/ Stationarity (Dickey Fuller Unit Root Test)	
	Value	P-value	Value	P-value	Coefficient- 95%Confidence Interval (LCI, UCI)	P-value	Coefficient 95%Confidence Interval (LCI, UCI)	P-value			D-Value (before)	D-Value (after)	P-value	Result
(Y_{11})	55.19	0.00*	5.02	0.00*	-15.42(-23.38, -7.45)	0.00*	-4.95(-6.12, -3.78)	0.00*	0.71		1.84	No AC	0.00	No Seasonality
Y_{12}- First differencing with MA1	28.87	0.00*	7.2	0.00*	-7.17(-12.11, -2.23)	0.01*	-7.30(-8.49, -6.11)	0.00*	0.81		2.84	1.91	1.00	Data is not Stationary
(Y_{13}) with AR1	92.15	0.00*	0.7	0.22	0.97(-4.86, 6.80)	0.74	-0.84(-1.98, 0.30)	0.14	0.33		1.27	1.91	0.02	No Seasonality
(Y_{14}) with MA1	77.43	0.00*	2.61	0.00*	-11.68(-20.04, -3.31)	0.01*	-2.48(-4.07, -0.88)	0.00*	0.8		0.78	2.13	0.00	No Seasonality
(Y_{15}) with AR1	97.01	0.00*	0.22	0.81	-6.17(-14.37, 2.03)	0.14	-0.02(-1.90, 1.87)	0.98	0.45		0.92	1.75	0.00	No Seasonality
(Y_{16})	67.2	0.00*	3.75	0.00*	-12.83(-21.63, -4.03)	0.01*	-3.64(-4.94, -2.35)	0.00*	0.53		1.76	No AC	0.00	No Seasonality

Table 6.6 Infection control, patient records and mortality rate

Model Validation and Parameter Estimation											Diagnostic tests			
MODEL QPS 3.9 Availability, Content and Use of Patient Records	Intercept		Time(β_1)		Intervention (β_2) (Change in Level)		Tim_Aft_Int (β_3) (Change in Slope)		R^2		Autocorrelation (AC) Check Durbin Watson		Test for Seasonality/ Stationarity (Dickey Fuller Unit Root Test)	
	Value	P-value	Value	P-value	Coefficient 95%Confidence Interval (LCI, UCI)	P-value	Coefficient 95%Confidence Interval (LCI, UCI)	P-value			D-Value (before)	D-Value (after)	P-value	Result
(Y_{17})	0.03	0.03*	0.002	0.21	-0.04(-0.06, -0.01)	0.00*	-0.00(-0.01, 0.00)	0.18	0.35		1.56	No AC	0.00	No Seasonality
QPS 3.10 Infection Control, Surveillance and Reporting														
(Y_{18})	6.90	0.00*	-0.71	0.00*	1.41(0.09, 2.72)	0.04*	0.70(0.31, 1.100	0.001*	0.30		1.63	No AC	0.00	No Seasonality
(Y_{19})	0.65	0.22	-0.05	0.48	0.25(-0.81, 1.32)	0.63	0.08(-0.08, 0.23)	0.33	0.12		1.61	No AC	0.00	No Seasonality
(Y_{20})	0.08	0.50	0.00	1.00	-0.05(-0.29, 0.18)	0.64	0.00(-0.03, 0.04)	0.81	0.51		2.31	No AC	0.00	No Seasonality
Mortality Rate														
(Y_{21})	-0.04	0.59	0.02	0.15	-0.01(-0.16, 0.140	0.90	-0.02(-0.04, 0.01)	0.15	0.10		2.00	No AC	0.00	No Seasonality

6.5.9 International Patient Safety Goal Measures (IPSGs) (Table 6.7)

Four out of the six patient safety goal measures recorded an immediate decrease in level post-accreditation survey, but only ($\boldsymbol{Y_{23}}$) was significant. While five out of the six measures recorded a negative change in the post- accreditation slope, of which four ($\boldsymbol{Y_{22}}$, $\boldsymbol{Y_{23}}$, $\boldsymbol{Y_{24}}$ and $\boldsymbol{Y_{27}}$) were significant. The purpose of the IPSGs is to highlight problematic areas in healthcare and to promote specific improvements in patient safety. These measures are important to the organisation and thus the pre-accreditation and overall performance was relatively high. In addition, both the accreditation survey and implementation of the standards did not have a significant effect as the organisation had already implemented the safe surgery practice prior to these interventions.

The above effects may be attributed to three factors. First, Surgical Safety was considered an organisational priority and thus a Failure Modes Effects Analysis (FMEA) was conducted as a quality improvement project. This required that the surgical team review the surgical safety process and the potential areas of failure. An action plan was formulated to circumvent error prone processes and the JCI Universal protocol for safe surgery was implemented in July 2009. Second, JCI considers surgical safety and the universal protocol as an International Patient Safety Goal. Organisations that fail this standard, fail the entire accreditation survey. Finally, surgery on the incorrect patient, site or side is known as a sentinel event. The repercussions for the organisation are serious and mandate reporting to JCI and HAAD, which, may result in unfavourable publicity that would adversely affect the reputation of the hospital. Most importantly, wrong site surgery may cause permanent harm or death in a patient.

Table 6.7 International patient safety goals

Model Validation and Parameter Estimation										**Diagnostic tests**			
MODEL: International Patient Safety Goals	**Intercept**		**Time (β_1)**		**Intervention (β_2) (Change in Level)**		**Tim_Aft_Int (β_3) (Change in Slope)**		**R^2**	**Autocorrelation (AC) Check Durbin Watson**		**Test for Seasonality/ Stationarity (Dickey Fuller Unit Root Test)**	
	Value	**P-value**	**Value**	**P-value**	**Coefficient 95%Confidence Interval (LCI, UCI)**	**P-value**	**Coefficient 95%Confidence Interval (LCI, UCI)**	**P-value**		**D-Value (before)**	**D-Value (after)**	**P-value**	**Result**
(Y_{22}) with AR1 and AR2	40.56	0.000*	5.20	0.00*	0.79(-4.37, 5.94)	0.76	-5.269-6.19, -4.34)	0.00*	0.94	1.05	2.07	0.00	No Seasonality
(Y_{23}) first differencing with AR1 and AR2	25.70	0.000*	7.51	0.00*	-14.89(-21.30, -8.49)	0.00*	-7.36(-8.64, -6.08)	0.00*	0.90	1.1	2.43	0.14	Seasonality
(Y_{24})	91.94	0.000*	0.65	0.00*	0.21(-2.46, 2.89)	0.87	-0.67(-1.07, -0.28)	0.00*	0.42	1.96	No AC	0.00	No Seasonality
Y_{25}	-0.02	0.96	0.02	0.71	0.14(-0.43, 0.71)	0.62	-0.02(-0.11, 0.06)	0.62	0.03	1.72	No AC	0.00	No Seasonality
Y_{26} with first differencing and MA1	98.48	0.00*	-0.10	0.1	1.71(1.04, 2.38)	0.00*	0.11(0.00, 0.230)	0.06	0.52	2.86	2.03	0.06	Data Not Stationary
Y_{27} with first differencing with AR1 and AR2	55.51	0.00*	55.51	0.00*	-1.67(-6.29, 2.96)	0.47	-4.26(-5.30, -3.22)	0.00*	0.90	0.89	2.6	0.26	No Seasonality

6.6 Discussion

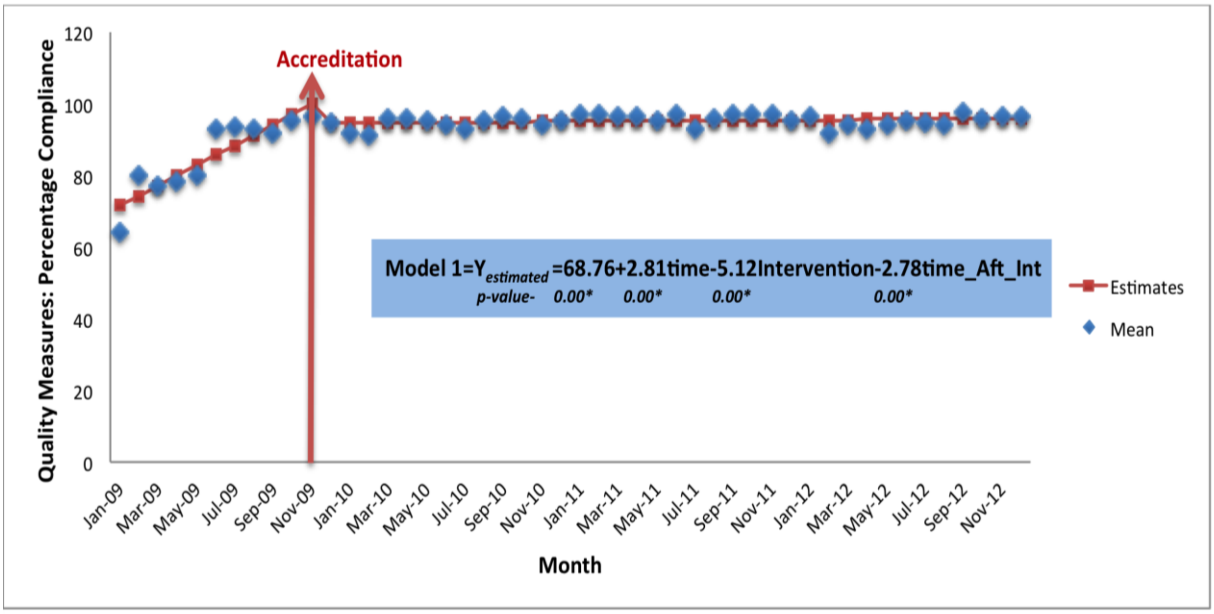
6.6.1 Impact of the accreditation survey (December 2009) on the 27 quality measures

1. From the analysis, 20 of the 27 (74%) measures display a positive pre-accreditation slope of which 13 (48%) are statistically significant ($P \leq 0.05$).
2. A key finding is that accreditation had no significant impact (either positive or negative) on 11 out of the 27 measures.
3. The accreditation survey resulted in a significant positive change in level for only 2 (7%) of the measures (medication errors and hand hygiene compliance). Conversely, a significant negative change in level was observed in 7 (26%) of the measures.
4. Only 1 measure (4%), (Troponin turnaround time) resulted in a significant positive change in the post-accreditation slope.
5. Accreditation was associated with a significant negative change in slope in 13 (48%) of the measures.
6. Of the 27 quality measures, there was no significant positive change in the level of 25 measures post-accreditation. Additionally, there was no significant positive change in the slope of 26 measures post-accreditation.

Accreditation resulted more frequently in a significant negative change in level (7 measures) than a positive change in level (2 measures) after the survey. Moreover, accreditation had a much larger significant negative effect (48% of measures) than a positive effect (4%) on the slope. Even though the organisation had no significant changes in structure or service lines, and the same Quality Manager was employed for the entire period of observation, accreditation improvement proved difficult to sustain. Continuous survey readiness is fundamental and thus a policy of unannounced surveys may well enhance performance improvement. Frequent internal or external surveys may also encourage organisations to maintain the process of improvement. In addition, since many of the measures had existing high values pre-accreditation, any improvement in the performance may have been too small to be statistically significant.

Figure 6.2 (below) illustrates the pattern of accreditation compliance using quality measures. The hospital ramps up its performance prior to the survey. There is a sharp incline in the pre-accreditation slope with an immediate drop post-accreditation survey. This is followed by an undulating plateau in performance during the three year period. The results demonstrate that once the accreditation survey is finished and the surveyors have left the organisation, performance declines. However, the figure shows that there is a residual benefit from accreditation three years later with performance being some 20 percentage points higher than the baseline level in January 2009.

Figure 6.2 Time series graph of the seventeen quality measures (before and after accreditation)



Note: the average means of the following quality measures were used to create this time series graph: Y_1, Y_2, Y_3, Y_4, Y_7, Y_{11}, Y_{12}, Y_{13}, Y_{14}, Y_{15}, Y_{16}, Y_{17}, Y_{22}, Y_{23}, Y_{24}, Y_{25}, Y_{27}.

It can be argued that the on-site evaluation during an accreditation survey might only be seen as an organisational snapshot on the given day of the survey and thus all accreditation systems suffer from the potential criticism that their impact ends following completion of the survey. In order to sustain their value, there is a need to encourage accreditation participants to perceive benefits from maintaining compliance with the standards. This is not only in support of continuous quality improvement methods; it also makes good business sense (Scrivens, 1995). Limited life expectancy of the accreditation status is a way to deal with this. It can be argued that the standards are not 'sensitive' enough to allow the possibility of actually evaluating improvements. This is based on the fact that it has been found by other accreditation organisations that several institutions already comply with the accreditation standards the first time around, and therefore based on the way that the standards are formulated, an improvement of quality by an organisations does not necessarily lead to receiving a higher degree of compliance of the standards because the organisation has already fully complied with them. This is largely because the standards are the maximum achievable across all types of hospitals independent of their complexity and service lines. In addition, the pass/fail concept does not drive performance beyond that of achieving compliance with standards. Thus, excellent organisations that already comply with the standards are not incentivised by the accreditation process to improve their level of performance. Although, a comprehensive accreditation survey is designed to draw conclusions about the overall quality and capability of an organisation, it is important to recognise that this triennial snapshot is no substitute for on-going monitoring. As a result, strategies are required to reinforce the way accreditation might lead to improved quality of care. In recent times, alternative approaches used by The Joint Commission in the United States such as unannounced surveys and tracking patients with tracer methodologies along their path through a healthcare organisation, from pre-entry to discharge, are designed to help bring about improvements in accreditation processes and organisational and clinical systems. These are all relatively untested (Braithwaite *et al.*, 2010).

6.7 Conclusion

The most commonly used approach to evaluating accreditation systems has been a perception of benefits approach, which allows individuals to record their interpretations of improvements in the quality of service, changes in practices and their satisfaction with the process. Although perceived benefits are important in determining the acceptability of the accreditation process, they do not demonstrate that any change has taken place in the delivery of healthcare (Scrivens, 1995). Whilst many postulations about the benefits of accreditation processes exist, empirical evidence to prove those claims is still currently lacking. According to Greenfield and Braithwaite (2009), the fact that the empirical evidence base for accreditation, remains substantially undeveloped, creates a serious legitimacy problem for accreditation providers, policymakers and researchers. Achieving and maintaining an accreditation status requires a significant investment of resources, and for many organisations, the cost-effectiveness is debatable, including whether or not accreditation demonstrates a quantifiable improvement in healthcare delivery and outcomes (Nicklin and Dickson, 2009). Many countries are embarking on accreditation programs without any evidence about their effectiveness. Nevertheless, without an empirically grounded, comprehensive evidence base for accreditation, the varying positive and negative views about accreditation will remain anecdotal and influenced by ideology or preferences (Greenfield and Braithwaite, 2008). Therefore, this is the first study that uses time series analysis over a 4-year period to demonstrate the impact of accreditation on quality measures. Our findings show that preparation for the accreditation survey results in significant improvement as 74% of the measures had a significant positive pre-accreditation slope. Accreditation had a larger significant negative effect (48% of measures) than a positive effect (4%) on the post accreditation slope of performance. Similarly, accreditation had a larger significant negative change in level (26%) than a positive change in level (7%) after the accreditation survey. Moreover, accreditation had no significant impact on 11 out of the 27 measures. The time series analysis demonstrated that the impact of accreditation ends following completion of the survey. In order to sustain the value of accreditation, continuous survey readiness strategies and frequent assessments are required. In addition, the thesis makes recommendations on the fundamental components of an accreditation programme required to mitigate this effect and sustain improvement. It is argued that the implementation of standards combined with an external survey is no guarantee for continuous improvement. There needs to be a paradigm shift from a snap-shot assessment to a continual assessment. Accreditation can make a contribution to business improvement but if used incorrectly it can result in a bureaucratic system that is complex to sustain and engage staff. The research shows that while accreditation is beneficial, the framework of accreditation, continuous survey readiness, frequent self-assessment, frequent external review and other continuous quality improvement methods are necessary to sustain the positive impact of accreditation.

The next chapter describes the hospital accreditation Life Cycle Model that was derived from the interrupted time series analysis.

7. CHAPTER SEVEN - Hospital accreditation- a life cycle explanation

7.1 Introduction

As described in the previous chapter, hospital accreditation is frequently selected by healthcare leaders as a method to improve quality and is an integral part of healthcare systems in more than 70 countries. This growth can be attributed to the growing public awareness of medical errors and patient safety gaps in healthcare (Kohn, 1999). As cost containment continues to be a concern in many hospitals, organisations need to evaluate the value of accreditation as a long-term investment (Øvretveit, 2005). However, the literature shows mixed and inconsistent results over the impact and effectiveness of hospital accreditation (Shaw, 2003; Greenfield, *et al*., 2007; Griffith *et al*., 2002; Salmon *et al*., 2003; Øvretveit and Gustafson, 2003; Miller *et al*., 2005). Although accreditation is a framework for achieving and sustaining quality, empirical studies that evaluate whether accredited organisations sustain compliance with quality and patient safety standards over the accreditation cycle are lacking. Hence, this thesis seeks to answer the important question of whether accredited organisations maintain quality and patient safety standards over the accreditation cycle by developing and testing a life cycle explanation. This chapter develops and tests the Life Cycle Model to explain the pattern of hospital quality performance before, during and following the accreditation survey.

The accreditation life cycle defines the complex stages and dynamics of accreditation as a quality intervention. We shall test the validity of the Life Cycle Model against monthly data, for a series of quality measures recorded by the hospital over four years (between January 2009 and December 2012). This period incorporates an accreditation survey in December 2009.

Joint Commission International (JCI) has published an accreditation preparation strategy that suggests most hospitals will pass through various phases during the process of accreditation (JCI, 2010). Based upon the JCI process, we define four distinct phases of the accreditation cycle and derive predictions concerning the time series trend of compliance during each phase. The predictions are the building blocks of the life cycle framework. We then test the validity of the Life Cycle Model by calibrating interrupted time series regression equations for 23 key quality compliance measures.

7.2 The life cycle of accreditation

7.2.1 The initiation phase (Figure 7.1)

This involves laying the foundation for achieving compliance with the JCI quality standards. We describe two sub-phases: adoption and revitalisation (Figure 7.1). The adoption sub-phase is characterised by the implementation of the new standards. JCI recommends developing an internal structure, composed of teams and leaders to facilitate coordination of all the activities needed to prepare for accreditation (JCI, 2010, p. 58). A steering committee of team leaders coordinates the preparation. As JCI requires a number of mandatory policies and procedures, a document review is initiated. The revitalisation sub-phase is characterised by further improvement in compliance stimulated by a gap analysis. JCI recommends that a baseline assessment/gap analysis is carried out in order to compare current processes and compliance with the expectations of the standards (JCI, 2010, p. 78). This identifies the actions necessary to eliminate the gaps between an organisation's current performance and that necessary to achieve accreditation. Additionally, collection and analysis of baseline quality data are initiated and compared with the requirements of the quality monitoring standards (JCI, 2010, p.80). The process includes: (1) analysing compliance with the JCI standards; (2) developing an action plan to address deficiencies; (3) implementation of new processes and data collection targeting compliance to standards; (4) conducting an organisation-wide training programme; and (5) allocation of required resources. We predict that the initiation phase, as a whole, will be characterised by a gradual improvement in the degree of compliance to standards, i.e. a positive change in slope. Since it is also a period of change, sporadic improvements in performance may be expected as organisations pilot documents and alter practices.

7.2.2 The pre-survey phase

The pre-survey phase occurs within 3 to 6 months of the accreditation survey (Figure 7.1). It follows a mock survey, recommended by JCI, where the findings lead to a review of existing gaps and staff work on closing these within the short time frame (JCI, 2010, p.112). A marked improvement (ramp up) in compliance is expected to occur during the Pre-Survey Phase because staff are aware of the proximity of the survey and because the organisation invests resources in preparation. Furthermore, JCI accreditation requires submission of a four-month record of compliance measures prior to the accreditation survey, thus providing a further stimulus to improvement. Shaw (2004) stated that there is ample evidence that hospitals rapidly increase compliance with published standards only months before an external survey. Thus, it is hypothesised that the peak level of compliance performance will occur during the pre-survey phase.

7.2.3 The post- accreditation slump

The quality performance of most hospitals tends to fall back towards pre-accreditation levels immediately upon receiving accredited status. (Figure 7.1). Staff no longer feel the pressure to perform optimally and may focus on activities that were neglected or shelved during the pre-survey phase. This phase may be prolonged if there is a lack of leadership, no incentive to improve, competing demands, organisational changes or lack of continuous monitoring of performance. The loss of the quality manager, who is responsible for maintaining quality by measures such as periodic self-audit and continuous education, is potentially serious. If the goal was survey compliance rather than quality improvement, standards may not be embedded in practice and performance will not be sustained. We hypothesise that a sharp drop in *levels* of compliance will occur immediately following the accreditation survey followed by a negative change in *slope* over time.

7.2.4 The stagnation/maturation phase

This phase follows the post-accreditation slump and occurs a few months after the accreditation survey. Since the hospital is in compliance with the JCI standards, as validated by the survey, there are no new initiatives to drive further improvements, which are predicted to lead to stagnation in compliance performance. If there is no on-going performance management system, a decline may set in which may last until the next initiation phase in preparation for re-accreditation. Generally the accreditation process includes a periodic (snap-shot), as opposed to continuous assessment which leads to a more reactive rather than forward-looking focus and can be a factor in persistent quality deficiencies (Lewis, 2007). During this Stagnation phase, we hypothesise that there will be an undulating plateau of compliance characterised by sporadic changes but at an overall level above pre-accreditation values.

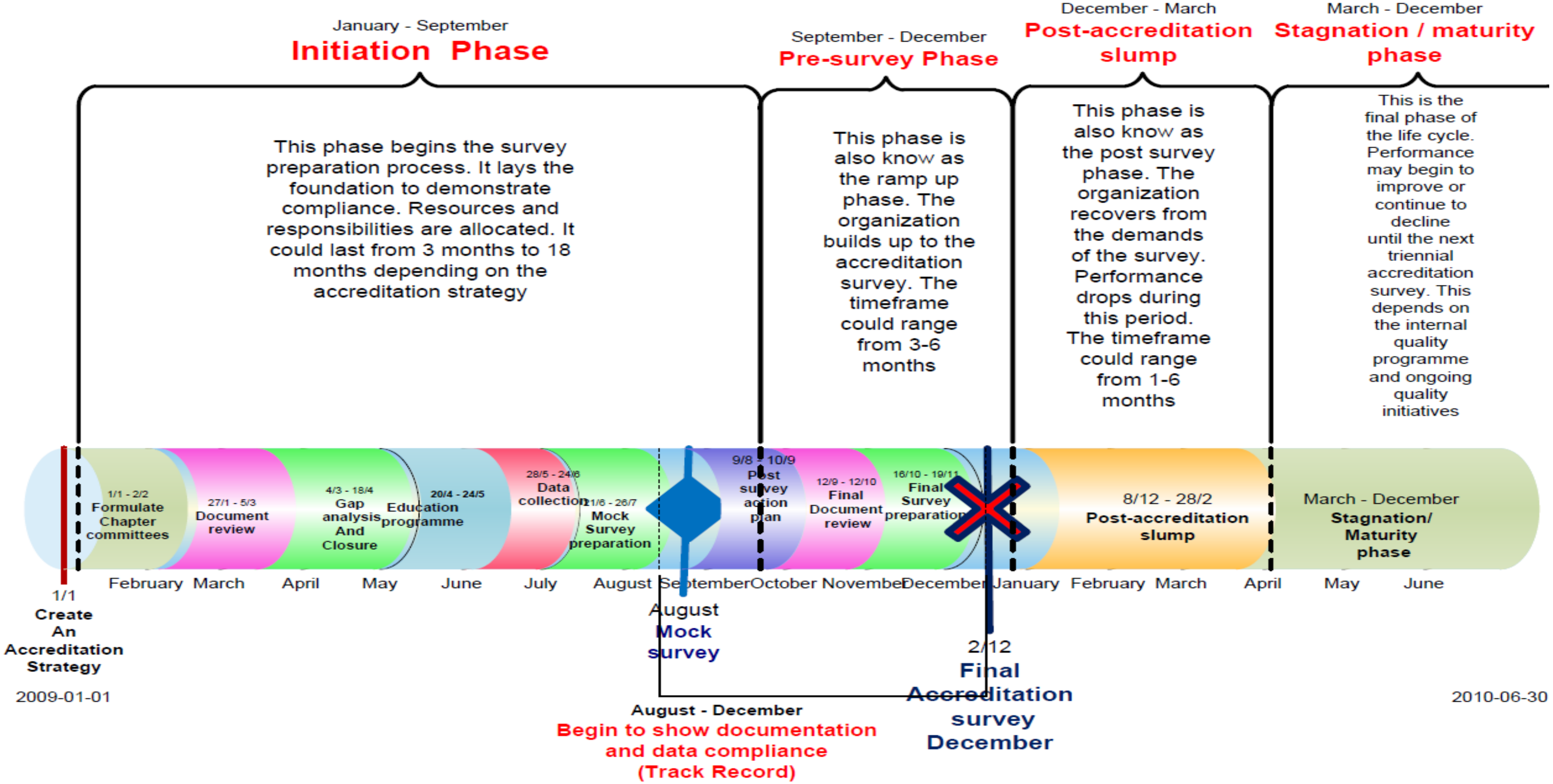


Figure 7.1 The accreditation life cycle phases and timeline

7.3 Methods

Measuring the effects of policy interventions is difficult since there is no unexposed control group available as policies are normally targeted towards the whole population simultaneously. As described in Chapter Six, interrupted time series analysis is the preferred statistical method for analysing temporally ordered measurements to determine if an intervention (e.g. accreditation) has produced a significant change in the measurements (Gillings *et al*., 1981; Bowling, 2002; Wagner *et al*., 2002). Linear segmented regression analysis is a partly controlled design where the trend before the accreditation intervention is used as a control period. The superiority of this method over a simple before-and-after study is due to the repeated monthly measures of variables while controlling for seasonality, secular trends and changes in the environment (Cook, 1979). Interrupted time series analysis distinguishes between the effects of time from that of intervention and is the most powerful, quasi-experimental design to evaluate longitudinal effects of time-limited interventions such as accreditation (see Chapter Six).

The set of observations of hospital performance making up the time-series data is conceptualised as the *realisation* of a process. Each segment of the time series exhibits both a level and a trend. A change in level, e.g. an increase or decrease in a quality measure after accreditation, constitutes an abrupt intervention effect. Conversely, the change in trend of a variable is an increase or decrease in the slope of the segment after accreditation compared with the segment preceding the accreditation. Shifts in level (intercept) or slope, with $P<0.01$, were defined as statistically significant. Segmented regression models fit a least squares regression line to each segment of the independent variable, time (Wagner *et al*., 2002). The following linear regression equation is specified to estimate the level and trend in the dependent variable before accreditation and the changes in the level and trend after accreditation:

$$Y_t = \beta_0 + \beta_1 \, x \, time_t + \beta_2 \, x \, intervention_t + \beta_3 \, x \, time \; after \; intervention_t + e_t \qquad \text{(Equation 7.1)}$$

Where Y_t is the outcome, $time_t$ indicates time in months at $time_t$ and *intervention* is a measure for $time_t$. *Time after intervention* is a continuous variable recording the number of months after the intervention at $time_t$ (see Chapter Six, Section 6.4.2).

In this model:

β_0 is the baseline level of the outcome at the beginning of the series;
β_1 is the slope prior to accreditation, i.e. the baseline trend;
β_2 is the change in level immediately after accreditation;
β_3 is the change in the slope from pre to post- accreditation and represents the monthly mean of the outcome variable;
e_t represents the random error term.

7.4 Testing the Life Cycle Model

In order to test the validity of the Life Cycle Model of accreditation a total of 23 quality measures were recorded each month at the hospital, over a four-year period, including a JCI accreditation survey (Table 7.1). The data collection process is described in detail in Chapter Six (see Section 6.3.3). To test the Life Cycle Model, quality measures that displayed an inverse relationship to percentage measures were transformed e.g. ‘percentage of surgical site infections’ were converted to the ‘percentage of infection-free surgeries’ thus higher values equate to good quality while, conversely, high rates of, for example, surgical site infection, indicate poor quality. Four out of the 27 quality measures could not be transformed to demonstrate consistency, in terms of high values indicating better quality, and were thus excluded from the analysis (Table 7.1). The excluded measures were the laboratory safety measures (timeliness of CBC and the Troponin turnaround time), infection control (healthcare associated infection rate) and the patient fall rate.

Table 7.1 Quality measure definitions for the time series analysis (Life Cycle Model)

Dimension of measurement	Code	Measures	Value
Patient Assessment	Y_1	Initial Medical Assessment done within 24 hours of admission	Percentage
	Y_2	Initial Nursing Assessment within 24 hr. of admission	Percentage
	Y_3	Pain Assessment Form Completed 100% per month	Percentage
	Y_4	Percentage of Completed Pain Reassessment	Percentage
Surgical Procedures	Y_5	Completion of Surgical Invasive Procedure Consent	Percentage
	Y_6	Percentage of Operating Room (OR) cancellation of Elective Surgery	Percentage
	Y_7	Unplanned return to OR within 48 hours (transformed)	Percentage
Medication error use and near-misses	Y_8	Reported medication Error (transformed)	Per 1000 prescriptions
Anaesthesia and Sedation Use	Y_9	Percentage of Completed Anaesthesia, Moderate and Deep Sedation Consent Form	Percentage
	Y_{10}	Percentage of completed Modified Aldrete Scores (Pre, Post, Discharge)	Percentage
	Y_{11}	Percentage of Completed Pre-Anaesthesia Assessments	Percentage
	Y_{12}	Completion of Anaesthesia Care Plan	Percentage
	Y_{13}	Percentage of completed Assessment of Patient who Received Anaesthesia	Percentage
	Y_{14}	Effective Communication of Risk, Benefit and alternatives of Anaesthesia Explained to Patients	Percentage
Availability, Content and use of Patient Records	Y_{15}	Percentage of Typed Post-Operative Report Completed with 48 hours	Percentage
Infection Control, Surveillance and Reporting	Y_{16}	Hospital Acquired methicillin resistant staph aureus (MRSA) Rate (transformed)	Per 1000 Admissions
	Y_{17}	Surgical Site Infection Rate (transformed)	Percentage
Reporting of Activities as	Y_{18}	Mortality rate (transformed)	Percentage

Required by Law and Regulation			
International Patient Safety Goals	Y_{19}	Monitoring Correct Site Marking	Percentage
	Y_{20}	Monitoring Compliance with the Time-out Procedure	Percentage
	Y_{21}	Screening of Patient Fall Risk	Percentage
	Y_{22}	Overall Hospital Hand Hygiene Compliance Rate	Percentage
	Y_{23}	Fall Risk Assessment and Reassessment	Percentage

Source: Author. Note: the coding of variables differ from that in Chapter Six

Next, in order to test whether the accreditation process exhibits the life cycle effect, several statistical predictions were specified for the 23 measures, which are consistent with the hypotheses previously specified concerning levels of compliance during the four phases of the Life Cycle Model:

- The measures should exhibit a positive change in slope in the pre-accreditation period (the Initiation Phase).
- The peak level of compliance should occur during the three months prior to the accreditation survey (the Pre-Survey Phase).
- The measures should record a negative change in level post the accreditation survey (the Post-Accreditation Slump).
- The measures should exhibit a negative change of slope post the accreditation survey (the Stagnation Phase).

7.5 Results

Table 7.2 outlines the interrupted time series equations for the 23 quality compliance measures, together with the diagnostic test results for autocorrelation and seasonality/stationarity. The pattern of results is clear. First, in 19 of the 23 measures, the β_1 coefficient (the slope prior to accreditation) is positive, as hypothesised; and in ten measures the coefficient is significant. Second, in 14 of the 23 equations, the β_2 coefficient (the change in *level* following accreditation) is negative, as postulated; and for seven measures, the parameter is significant (Table 7. 2). Third, in 20 of the 23 time series models, the β_3 coefficient (the slope post-accreditation) is negative, as predicted; and 11 of the coefficients are significant. Several of the interrupted time series equations, as indicated in Table 7.2, display autocorrelation (AC), in which cases the autoregressive (AR) or moving average (MA) variable was included to correct for it; while Y_{10} and Y_{20} displayed seasonality and were adjusted for non-stationarity using differencing. The ultimate confirmatory test of the proposed Life Cycle Model is to aggregate the data for all 23 quality compliance measures to produce a composite score (Y_C) and to fit an interrupted time series regression equation to the unweighted mean monthly value of the series (Table 7.3).

Table 7.2 Time series models for the 23 quality measures (Life Cycle Model)

Model Validation and Parameter Estimation													**Diagnostic tests**	
MODEL: QPS 1 Patient Assessment	**Intercept**		**Time (β_1)**		**Intervention (β_2) (Change in Level)**		**Tim_Aft_Int (β_3) (Change in Slope)**		**R^2**	**Autocorrelation (AC) Check Durbin Watson**			**Test for Seasonality/ Stationarity (Dickey Fuller Unit Root Test)**	
	Value	**P-value**	**Value**	**P-value**	**Coefficient- 95% Confidence interval (LCI-UCI)**	**P-value**	**Coefficient- 95% Confidence interval (LCI-UCI)**	**P-value**	**R^2**	**D-Value (before)**	**D-Value (after)**		**P-value**	**Result**
Model 2. Y_1 with AR term	**78.60**	0.00*	1.19	0.35	-4.54 (-16.33 to 7.25)	0.44	-0.99(-3.63 to 1.65)	0.45	0.38	1.00	1.92		0.03	#No S
Model 1 Y_2	**96.17**	0.00*	0.13	0.53	1.24 (-1.63 to 4.11)	0.38	-0.18 (-0.60 to 0.24)	0.39	0.09	1.46	No AC		0.00	#No S
Model 2. Y_3 with AR (1)	**94.56**	0.00*	0.16	0.85	-4.00 (-12.10 to 4.10)	0.33	-0.02 (-1.82 to 1.77)	0.98	0.34	1.05	2.22		0.04	#No S
Model 1. Y_4	**32.56**	0.00*	7.02	0.00*	-13.91 (-32.37 to 4.56)	0.14	-7.28 (-10.00 to -4.56)	0.00*	0.48	1.72	No AC		0.00	#No S
Model 2 Y_5 with MA (1)	**87.91**	0.00*	1.21	0.00*	-2.70(-4.76, -0.63)	0.01*	-1.18(-1.72, -0.64)	0.01*	0.96	1.30	2.53		0.00	#No S
Model 1 Y_6	**14.89**	0.00*	-0.28	0.38	-0.36(-4.66, 3.95)	0.87	0.32(-0.31, 0.95)	0.31	0.49	2.10	No AC		0.00	#No S
Model 1. Y_7 transformed	**99.92**	0.5	0.003	0.88	-0.05(-0.30, 0.20)	0.69	0.01(-0.03, 0.04)	0.63	0.34	1.86	No AC		0.00	#No S

Y_8 Medication errors transformed	**99.97**	0	-0.002	0.21	0.04 (0.01,0.06)	0.004 *	0.00 (-0.00,0.01)	0.18	0.35	1.56	No AC	0.003	#No S
Model 1. Y_9	**55.19**	0.00*	5.02	0.00*	-15.42(-23.38, -7.45)	0.00*	-4.95(-6.12, -3.78)	0.00*	0.71	1.84	No AC	0.00	#No S
Model 3. Y_{10} (First Differencing) with MA(1)	**28.87**	0.00*	7.2	0.00*	-7.17(-12.11, -2.23)	0.01*	-7.30(-8.49, -6.11)	0.00*	0.81	2.84	1.91	1.00	Seasonality/ Data are not Stationary
Model 2. Y_{11} with AR(1)	**92.15**	0.000*	0.7	0.22	0.97(-4.86, 6.80)	0.74	-0.84(-1.98, 0.30)	0.14	0.33	1.27	1.91	0.02	#No S
Model 3. Y_{12} with MA(1)	**77.43**	0.00*	2.61	0.00*	-11.68(-20.04, -3.31)	0.01*	-2.48(-4.07, -0.88)	0.00*	0.8	0.78	2.13	0.00	#No S
Model 2. Y_{13} with AR(1)	**97.01**	0.000*	0.22	0.81	-6.17(-14.37, 2.03)	0.14	-0.02(-1.90, 1.87)	0.98	0.45	0.92	1.75	0.00	#No S
Model 1.Y_{14}	**67.2**	0.00*	3.75	0.00*	-12.83(-21.63, -4.03)	0.01*	-3.64(-4.94, -2.35)	0.00*	0.53	1.76	No AC	0.00	#No S
Model 1. Y_{15}	57.33	0.000*	1.95	0.0058*	4.33(-4.98, 13.64)	0.35	-1.85(-3.22, -0.480	0.01*	0.54	1.75	No AC	0.01	#No S
Transformed MRSA rate Y_{16}	98.65	0	0.10	0.26	-0.16(-1.33,1.00)	0.78	-0.08(-0.26,0.09)	0.33	0.10	1.87	No AC	0.00	#No S
Transformed Surgical site infection rate Y_{17}	99.92	0	-2.58	1.00	0.05(-0.18,0.29)	0.6444	-0.004(-.040,0.031)	0.8137	0.05	2.31	No AC	0.00	#No S

Transformed Mortality rate Y_{18}	100.03	0	-0.02	0.145	0.01(-0.14,0.16)	0.886	-0.01(-0.01,0.04)	0.814	0.10	2.04	No AC	0.00	#No S
Model 3. Y_{19} with AR(1) and AR(2)	40.56	0.000*	5.20	0.00*	0.79(-4.37, 5.94)	0.76	-5.269(-6.19, -4.34)	0.00*	0.94	1.05	2.07	0.00	#No S
Model 6. Y_{20} (First Differencing) with AR(1) and AR(2)	25.70	0.000*	7.51	0.00*	-14.89(-21.30, -8.49)	0.00*	-7.36(-8.64, -6.08)	0.00*	0.90	1.1	2.43	0.14	Seasonality/ Data is not Stationary
Model 1. Y_{21}	91.94	0.000*	0.65	0.00*	0.21(-2.46, 2.89)	0.87	-0.67(-1.07, -0.28)	0.00*	0.42	1.96	No AC	0.00	#No S
Model 1. Y_{22}	-0.02	0.96	0.02	0.71	0.14(-0.43, 0.71)	0.62	-0.02(-0.11, 0.06)	0.62	0.03	1.72	No AC	0.00	#No S
Model 4. Y_{23} (First Differencing) with AR(1) and AR(2)	55.51	0.00*	55.51	0.00*	-1.67(-6.29, 2.96)	0.47	-4.26(-5.30, -3.22)	0.00*	0.90	0.89	2.6	0.26	#No S

* P≤0.05, Note: AC- Autocorrelation, # No S- indicates no seasonality and data are stationary

The results provide convincing proof of the Life Cycle Model (Figure 7. 2). The slope prior to accreditation (β_1) is positive and highly significant, as hypothesised. The change in level following the accreditation survey (β_2) signals a significant decline in compliance, as predicted; and, as postulated, the post-accreditation slope (β_3) is also negative and statistically significant (Table 7.3). Furthermore, over 87 per cent of the variation in quality compliance measures is explained by the three variables in the Life Cycle Model (R^2 = 0.87) (Table 7.3). The best-fit interrupted time series model not only contains three significant variables, but the size of the coefficients indicates that the effects of these variables are substantial. The pre-intervention slope (β_1) implies an increase in compliance by 2.19 percentage points per month prior to the accreditation survey. This Initiation Phase is characterised by a period of steep increases in compliance followed by sporadic declines. The β_2 coefficient suggests that the mean level of compliance for the 23 quality measures decreased by 3.95 percentage points immediately following the accreditation survey. The β_3 coefficient indicates a decrease in compliance of 2.16 percentage points per month post- accreditation. The post-accreditation slump is followed by a long period of stagnation characterised by an undulating plateau of compliance but, importantly, at a level of 20 percentage points higher than the pre-accreditation survey levels (Figure. 7.2).

Table 7.3 Time series model for the composite quality measures (Y_c)

	Model Validation and Parameter Estimation									Diagnostic tests			
Dimension	**MODEL**	**Intercept**		**Time (β_1)**		**Intervention (β_2) (Change in Level)**		**Tim_Aft_Int (β_3) (Change in Slope)**		**R^2**	**Autocorrelation (AC) Check Durbin Watson**		**Test for Seasonality/ Stationarity (Dickey Fuller Unit Root Test)**	
		Value	**P-value**	**Value**	**P-value**	**Coefficient 95% Confidence interval (LCI-UCI)**	**P-value**	**Coefficient 95% Confidence Interval (LCI-UCI)**	**P-value**	**R^2**	**D-Value (before)**	**D-Value (after)**	**P-value**	**Result**
*Mean_ Composite	**Y_c**	75.41	0.00	2.19	0.00	-3.95 (-6.39, -1.51)	0.00	-2.16 (-2.52, -1.80)	0.00	0.87	1.56	-	0.00	No Seasonality/ Data are Stationary

**Composite quality measure (Y_c) is the mean of the 23 quality measures*

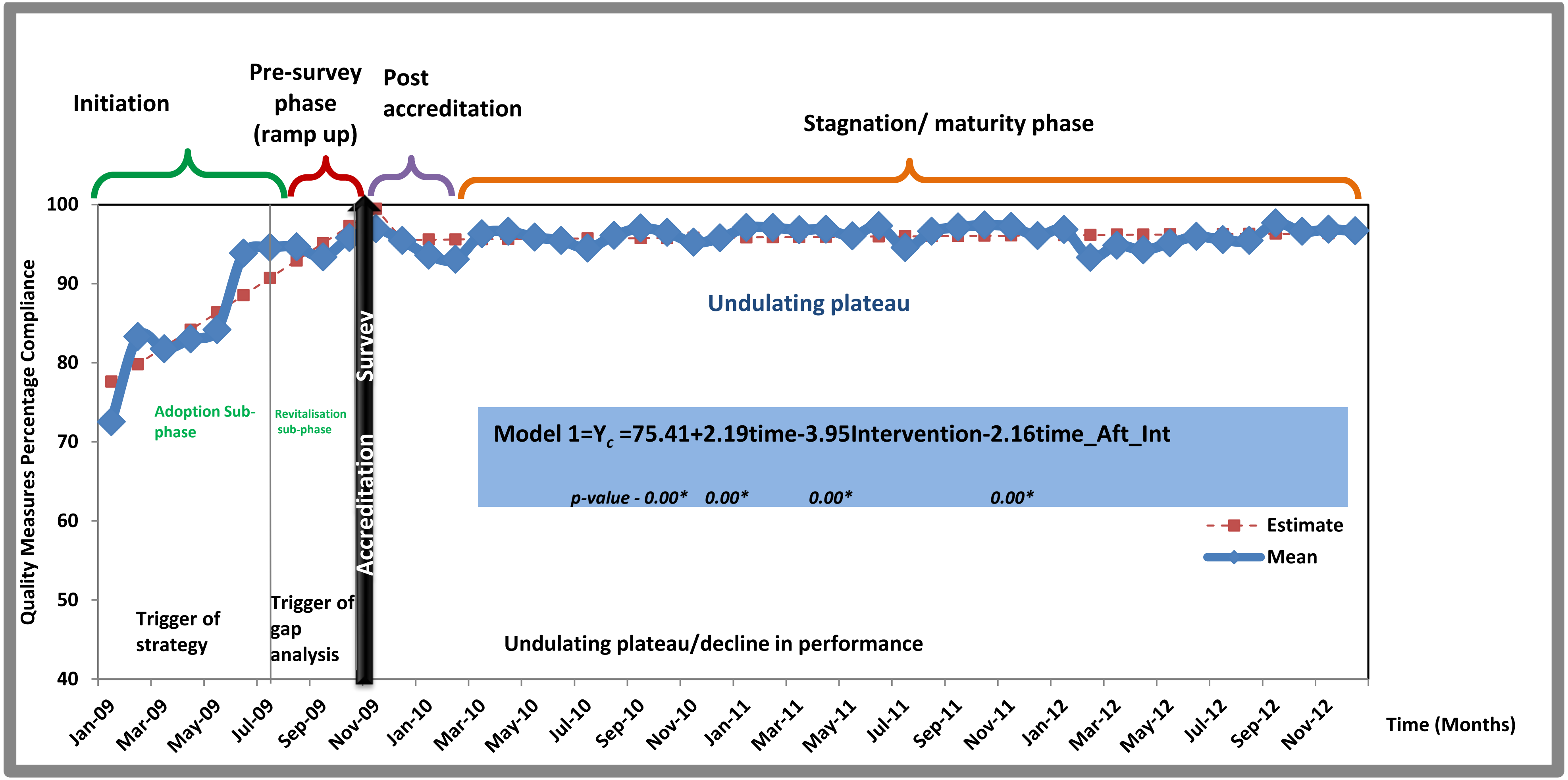


Figure 7.2 Phases of the Life Cycle Model - Empirical Evidence

7.6 Discussion

While there are many questions about the benefits of hospital accreditation, empirical evidence to support its effectiveness is still lacking. According to Greenfield and Braithwaite (2009), this creates a serious problem of legitimacy for policy makers and hospital managements. Is achieving and maintaining accreditation worth the time, effort and cost if there is uncertainty about whether it results in quantifiable improvements in healthcare delivery and outcomes (Nicklin and Dickson, 2009)? Shaw (2003) has argued that many countries are embarking on accreditation programmes without any evidence that they are the best use of resources for improving quality. While proof of the value of accreditation is so far inconclusive, there is also no conclusive evidence that there are no benefits or that resources are being wasted (Øvretveit and Gustafson, 2003). Nevertheless, without an empirically grounded evidence base for accreditation, the debate about the effects of accreditation – both positive and negative – will remain anecdotal, influenced by political ideology and driven by such biases (Greenfield and Braithwaite, 2009).

This is the first interrupted time series analysis of accreditation. This is also the first research to use interrupted time series regression analysis over a four-year period to test for the impact of accreditation on quality compliance measures in healthcare. Furthermore this thesis has outlined a new conceptual framework of hospital accreditation – the Life Cycle Model and presented statistical evidence that strongly supports it. More studies are needed to test the validity of this life cycle framework in different national and cultural settings.

7.7 Policy implications

The results demonstrate that once the accreditation survey is finished and the surveyors have left the organisation, performance falls but then levels of to some 20 percentage points above the baseline level (January 2009). It can be argued that the on-site evaluation during an accreditation survey might only be seen as an organisational 'snapshot' on the given day of the survey (Rooney and van Ostenberg, 1999), and thus all accreditation systems suffer from the potential criticism that their impact ends following completion of the survey. In order to sustain their value, and indeed their influence, there is a need to encourage participants to continue to maintain the standards and to perceive benefits from them. This is not only in line with the models of continuous quality improvement; it also makes good commercial sense (Scrivens, 1995). A recent investigation noted the need for continual refinement in accreditation agency operations and programme delivery as the contributing factors for successful implementation of accreditation programs in low and middle-income countries (Braithwaite *et al*., 2012). The investigation also highlighted other system-level factors such as: on-going and stable financial and policy support from government; and incentives for healthcare organisations to participate in accreditation programmes. Limited life expectancy of the accreditation status is a way to deal with this. It can be argued that the standards are not 'sensitive' enough to allow the possibility of actually evaluating improvements. This is based on the fact that it has been found by other accreditation organisations that several institutions already comply with the accreditation standards the first time around, and therefore based on the way that the standards are formulated, an improvement of quality by an organisations does not necessarily lead to a higher degree of compliance of the standards because the organisation has already fully complied with them (Krevi, 2009). This is largely because the standards are maximum achievable across all types of hospitals independent of their complexity and service lines. In addition, the pass/fail concept does not drive performance beyond achieving compliance with standards. Thus excellent organisations that already comply with the standards are not incentivised by the accreditation process to improve their level of performance.

Although accreditation surveys are supposed to comprehensive enough to draw conclusions about the overall quality of an organisation, it is still a triennial snapshot which is no substitute for on-going monitoring (Rooney and van Ostenberg, 1999). Strategies are, as a result, required to reinforce the way accreditation might lead to improved quality of care. In recent times, alternative approaches used by The Joint Commission, in the United States, such as unannounced surveys and tracking patients with tracer methodologies along their path through a healthcare organisation, from pre-entry to discharge, are designed to help bring about improvements in accreditation processes and organisational and clinical systems, but these are all relatively untested (Braithwaite *et al.*, 2010).

7.7.1 *Criticisms of the accreditation process*

The JCI process improvement methodology is not structured for example like the Internal Organisation of Standards (ISO), which uses PDSA (Plan Do Study Act) cycle. Although a mandate to improve quality and processes is inherent in the standard (Standard QPS.9, Improvement in quality and safety is achieved and sustained), leaving this important area unstructured permits great variation in practice and organisations have a challenge implementing an effective improvement strategy (JCI, 2011).

1. At the time of writing this thesis, JCI did not have a data library or benchmarking of accredited organisations. Benchmarking would lead to sharing best practices and hold organisations accountable for maintaining good performance. Creating a library of mandatory reporting measures that are shared publicly or with other internationally accredited organisations would improve performance (Chuang *et al*., 2013). In recent times, healthcare organisations have begun focusing on the measurement of clinical effectiveness. Thus, in order demonstrate the efficacy of treatments, appropriate outcome measures were sought to assist in policy and management decisions about the appropriateness and the selection of clinical treatment and patient management. The Joint Commission in the US has reacted to this focus and utilised measures that are able to reveal that the clinical care provided was clinically effective. Accreditation standards are different from these clinical measures, which only demonstrate the process performance of a healthcare organisation (The Joint Commission, 2012). In addition, reliable and valid clinical outcome measures would answer the perpetual question of whether accreditation and compliance to its standards has a causal relationship with good patient outcomes. Understandably, outcome measures are difficult to develop, but measures that indicate best practice are widely available. In contrast, JCI is trying to develop an effective indicator system which will not involve too much of a burden on the participating healthcare organisation, although at present the concentration is more on organisational indicators than comparable clinical outcome indicators. For example, the Australian Council has defined a clinical indicator as ‘a measure of the clinical management and outcome of care’ and has identified three requirements: that the data are available; that the area is relevant to clinical practice; that quantitative results are achievable. It is recommended that the measures should

encompass patient outcomes, patient experience and utilisation. In many cases they will be surrogates for anticipated results because they are already clearly related to outcomes, e.g. retinal examinations for diabetic patients. The indicators should be able to act as point in time measures, generate trends in time and also enable comparisons of organisational performance of similar organisations. Accreditation Canada has done this through its Qmentum programme combining indicator data with their 'instrument' data obtained through questionnaires completed by representative samples of clients, staff, leadership and/or other key stakeholders (Nicklin, 2009).

2. There is no intra-cycle survey or periodic assessments between the survey periods. The Joint Commission in the US has established the expectation of continual readiness with the implementation of the unannounced survey. The Periodic Performance Review is a Joint Commission annual requirement. Organisations assess their level of compliance for each standard and element of performance. This self-assessment forms the basis of the improvement efforts for gaps in compliance (Piotrowski, 2005). However, even these self-assessments are not mandated by JCI. In the unannounced survey, the organisation receives no advance notice of the timing of their accreditation survey. This shift in the accreditation inspection process from a scheduled to unscheduled survey was a significant change that required hospitals to change from a survey preparation mind-set to one of continual readiness. However, at the time of writing, this process was not implemented for internationally accredited organisations by JCI.

3. JCI also implements frequent changes in the standards (every 3 years). Thus, compliance will always decrease when these new processes are implemented to because of the learning curve. Unlike ISO and other standards that have infrequent changes (every 8 years), which allow for stabilisation of the process, annual surveys support the continuous quality improvement cycle.

4. JCI is not aligned with regulatory standards in each country, although it is challenging for JCI to do so as one set of changes is applicable to approximately 50 countries and 500 accredited organisations. The organisation also finds it challenging as it has to continually review and evaluate compliance to two or more

bodies. Furthermore, the JCI surveyors are always recruited from the United States, thus, by default; they are not familiar with country specific regulatory standards.

5. JCI does not include all processes in the organisation in its standards. It only includes processes that directly or indirectly have an impact on the patient. ISO and other standards include all processes within the organisation and all departments are audited in their audit cycle.

6. JCI has no ability to differentiate the *levels* of quality between accredited organisations. The organisation's post-survey demarcation is either 'accredited' or 'accreditation denied'. Furthermore, the results of the survey are not for public consumption. In fact, JCI does not report those organisations that attempted accreditation and failed. JCI only maintains publicly a list of accredited organisations on their website.

7. Accreditation relies primarily on the documentation of structures and processes that demonstrate adherence to administrative standards but not disease-specific clinical processes/outcomes. There are challenges in demonstrating improvement at the level of physician practice, developing reliable and valid clinical measures, and those that capture the patient's experience of care.

7.7.2 Recommended accreditation model

Based on the thesis results, the recommended accreditation model is as follows:

1. Regular and random external assessments including self- assessments that can be reported directly to the accrediting body.
2. Benchmarking of accredited organisations' by the accrediting body and submission of quality measures to a data library to review the improvement between surveys
3. Review and change of the JCI standards should be more infrequent to allow for stabilisation and for internal improvements to occur.
4. Review the challenge of harmonising international standards with national regulation. Surveyors should be familiar with the national regulations of the country in which they survey

5. It is relevant to note how improvement prioritisation takes place in accredited organisations. In some models, joint quality monitoring and action plans for quality improvement will be made for the entire organisation or for each of its units. The action plans are supposed to reflect the management's prioritisation of the identified quality flaws. The problem is that it is not made clear how the management of the organisations is supposed to prioritise these action plans and efforts to improve quality. Since the accreditation standards are not necessarily causally linked to quality, it is not possible to determine quantitatively where the efforts and resources are best used. While this process is supposed to provide analysis, evaluations and suggestions to the management's prioritisation of actions for quality improvement, it is still difficult to ensure that this will be done efficiently without causing information overload. Furthermore, a structured improvement process should be defined by JCI to ensure the effectiveness of process improvement within the organisation. This, coupled with mandatory reporting of quality measures, will ensure that organisations do not follow the life cycle of accreditation but maintain continuous survey readiness and improvement.

6. Accreditation bodies need to attempt to involve all processes in the organisation. Whether this is through a process of self-reported quality measures, self-assessment or external survey, it is important that everyone in the organisation feels accountable for the outcome of a survey and thus quality of care.

7. Accredited organisations should also support training and development of the organisations internal surveyors or auditors. Whether this is mandated through a standard or reported frequently to the accrediting body, it will improve the process of continuous quality improvement in the organisation. Currently, JCI mandates the implementation of quality improvement projects, five clinical pathways and guidelines annually (JCI, 2011).

8. The accreditation standards largely review processes of care and not clinical outcomes. A crucial issue with the choice of implementing an accreditation model is ultimately whether accreditation even ensures quality, or has positive effects on the quality of care delivered by the accredited organisations. Achieving accreditation is typically regarded as a predictor of clinical care and organisational effectiveness by funders, institutions, patients and the public. It follows that

accreditation is meant to lead to confidence in the quality of care provided by an organisation. However, according to Øvretveit (2001) there is no real guarantee that an organisation which is well assessed during the accreditation process will always provide high quality care. The only guarantee that exists is that the organisation meets standards which are deemed necessary by the accreditation organisation. Anecdotal reports suggest that some accredited or well assessed organisations do not deliver high quality care, but, as yet, little research evidence has emerged providing information on quality from the application of different schemes, or from comparisons between assessed and non-assessed organisations (Øvretveit, 2001). This means that, despite the fact that we are living in an increasingly evidence-based world, there has been very little hard evidence presented as to what impact individual accreditation programmes have on the healthcare system, or on benefits to healthcare providers and other stakeholders (Shaw, 2003). As in this study, there is abundant evidence that hospitals rapidly increase compliance with the accreditation standards in the months prior to the surveys and improve their organisational processes. There is still much less evidence that this brings benefits to the clinical process and the outcome of the healthcare systems (Shaw, 2003).

7.8 Conclusion

Benchmarking of accredited organisations by the accrediting body and submission of quality measures to a data library may stimulate improvement between surveys. At the time of writing, JCI does not have a data library for benchmarking of accredited organisations. Benchmarking allows sharing of best practices and holds organisations accountable for maintaining good performance. Creating a library of mandatory reporting measures that are shared publicly or with other internationally accredited organisations would improve performance (Chuang *et al.*, 2013). In recent times, healthcare organisations have begun focusing on the measurement of clinical effectiveness. Thus, in order demonstrate the efficacy of treatments, appropriate outcome measures were sought to assist in policy and management decisions about the appropriateness and the selection of clinical treatment. In addition, reliable and valid clinical outcome measures would answer the fundamental question of whether accreditation and compliance to its standards, has a causal relationship with patient outcomes.

In the US, the Joint Commission has established the expectation of continual readiness with the implementation of the unannounced survey in 2009 and annual Periodic Performance Reviews. This self-assessment forms the basis of the improvement efforts for gaps in compliance (Piotrowski, 2005). However, self-assessments and intra-cycle surveys are not mandated by JCI. A paradigm shift, from the scheduled accreditation survey to an unannounced survey, is recommended. This may result in a change from a survey preparation mind-set to that of continual readiness.

Accreditation standards largely review processes of care and not clinical outcomes. Achieving accreditation is typically regarded as a predictor of clinical care and organisational effectiveness by funders, institutions, patients and the public. This is meant to create confidence in the quality of care provided by an organisation. According to Øvretveit (2001), accreditation does not guarantee that an accredited organisation will always provide high quality care. Accreditation only guarantees that the organisation meets standards which are deemed necessary by the accreditation organisation.

The thesis has answered the key question: do hospitals maintain quality and patients safety standards over the accreditation cycle? There is a residual benefit of accreditation with the performance level maintained at approximately 20% higher than the baseline level. However, the results clearly demonstrate that implementation of accreditation standards does not guarantee that accredited organisations will sustain the improvement in healthcare quality measures gained during survey preparation. Acceptance of the accreditation life cycle framework offers a blueprint for improving strategy on quality of healthcare. A major benefit of the concept is that stagnation and declining outcomes can be avoided by monitoring the life cycle and taking proactive initiatives, at appropriate times, in order to sustain performance. The Life Cycle Model also justifies the need for a continuous survey readiness programme throughout the organisation.

Continuous readiness has been described as being ‘ready for the next patient, not just the next survey’ (Valentine, 2009). Continuous survey readiness strategies may also be enhanced by self-assessments to create a heightened awareness of the level of compliance and standards. Benchmarking, training and intra-cycle mock surveys can also be used to mitigate the stagnation phase by revitalising the quality improvement journey. Furthermore, it is recommended that a process improvement plan for continuous readiness is established using proven quality assurance tools. A triennial snapshot is no substitute for on-going monitoring and continual improvement. Continuous survey readiness may ameliorate the life cycle effect of accreditation provided the organisation is required to implement such a resource intensive programme by the accreditation body.

8. CHAPTER EIGHT: Conclusion

This chapter concludes the thesis. It describes the strengths and limitations of the three study components (the patient experience case study, the cross-sectional study and the time series analysis). The last section provides a summary of the research process, an overview of the findings and its implications for healthcare accreditation and patient experience. Finally, the chapter concludes with suggestions for future research initiatives.

8.1 Strengths and limitations of the research

8.1.1 Time series analysis of 27 quality measures

Interrupted time series is a strong quasi-experimental design increasingly used in healthcare research. Segmented linear regression analysis of time series data allows researchers to evaluate the effect of quality interventions, expressed as the estimated absolute difference at a particular time point between the outcome of interest with the intervention and in the absence of the intervention, as well as the percentage change in this outcome. There are recognised limitations of the time series analysis particularly when interventions are implemented slowly and effects may be diffuse. Particularly with regard to accreditation as a continuous quality improvement process, effects may occur with unpredictable time delays. In this study the data series included monthly observations over a four-year period and thus negated any limitation of a shorter time series. Furthermore, due to the data validation process for the Al Noor Hospital KPIs, missing data were avoided.

The literature describes time series as an excellent alternative to the randomised control trial which is a gold standard by which effectiveness is measured in clinical disciplines. Time series analysis has much strength and unlike simple analysis, any trends, both before and after a change (intervention) are recognised and analysed. Possible cyclical effects can be captured and any discontinuity can be reviewed. Variances around the means before and after the intervention may be different. Quality intervention effects may drift back toward the pre-intervention level and/or slope over time if the effect is not sustained. In addition, effects may be immediate or delayed. Time series analysis accounts for these effects. Interrupted time series is a special kind of time series in which we know the specific point in the series at which an intervention occurred. This allows for causal hypothesis in that observations after treatment will have a different level or slope from those before intervention. Therefore it is a strong methodological design alternative randomised design if this is not feasible.

8.1.2 The cross-sectional study of 27 hospitals

Cross-sectional designs are limited in their ability to infer causation. Additionally, the benefits of accreditation may only become apparent over time thus a snap shot cross-sectional analysis is inadequate in assessing accreditation whilst factoring in the effects of time. Our time series analysis thus compensated for the weaknesses in cross-sectional designs (Chapter Five). The use of secondary data (collected and presented by GRMC) is a further limitation of the cross-sectional study. Demographic and other information regarding individual survey respondents were unavailable. This information could have been used in order to assess patient characteristics that influence patient experience. The data did not permit the researcher the opportunity to speak with respondents in order gain qualitative measurements and assessments of hospital experiences. There was also no data on what dependent variables respondents deemed more or less important. This may have enabled more focused research regarding patient preferences and hospital experiences. Nonetheless these components were assessed in the case study of patient experience (Chapter Four).

Notwithstanding the methodological weaknesses, the cross-sectional study adds value in terms making comparisons of hospitals against a single accreditation programme, JCI. Secondly, this chapter was able to assess the impact of accreditation on inpatient and outpatient experience ratings. Thirdly, cross-sectional data were available for rankings and comparisons of the hospitals and hospital characteristics. Fourthly, this is the first research in the Middle East to examine the relationship between accreditation and patient experience. At the policy level, the findings may inform the UAE regulatory authorities decisions on using patient experience data to compare the quality of care across hospitals. Such an intervention, if publicly reported, could have serious consequences on organisations in insurance payment, market reputation, referrals etc. Finally, the cross-sectional study demonstrates that there is a relationship between two fundamental parameters of quality (accreditation and patient experience). Accreditation and patient surveys might be useful complements to one another in terms of quality improvement.

8.1.3 The case study analysis of patient experience

The patient experience survey used a validated reliable and piloted survey tool. In addition, there was a 100% response rate as the survey was administered face-to-face. This meant that there was participation by patients who had experienced the full range of the hospital care process, thus providing a balanced view of patient experience. In addition, the range of variables, as predictors, used in this study has been unsurpassed by previous research in the literature review.

There are limitations to the case study. Firstly, our analysis is limited to one acute care hospital in UAE. Secondly, the data had a time frame limitation as surveys were conducted over a two-month period. We have discovered reliable relationships between the patient experience outcome measures and the patient demographics and stay characteristics. In the field of patient experience research, our understanding of the relationships between the variables is important but does not enable us to make precise predictions. Predicting human behaviour is more challenging than predicting the performance of, say, physical processes. We can still draw important conclusions about the statistically significant predictors particularly in this case where we have found that the *B*-coefficients have a higher negative value with a longer the length of stay. Other underlying factors that influence patient experience were beyond the scope of this thesis. For example, disease history, level of anxiety, mental attitude, geographic location, health literacy etc. may influence how patients in the UAE perceive their hospital experience. Hence, we cannot draw causal inferences from the patient experience study but rather we have explored the associations and nature of relationships that exist between the dependent and independent variables. The understanding gained will make a contribution to the improvement in the way healthcare is delivered in the UAE (see Section 8.2.2).

8.2 Conclusion

This section marks the final chapter in the thesis. It provides triangulation of the three thesis components and its implications for healthcare accreditation and patient experience; it concludes with suggestions for future research initiatives.

8.2.1 Triangulation of the research findings

Triangulation refers to the use of a multimethod research approach to investigate a research question in order to increase confidence in the resultant findings. It does so by overcoming inherent weaknesses and biases associated with a singular research method (Denzin, 1978, p.291). According to Denzin (1970) four types of triangulation exist: (1) data triangulation, comparison of data that have been gathered at different times through different samples; (2) investigator triangulation, comparison of more than one investigator results examining the same phenomenon; (3) theory triangulation, comparison of different theoretical perspectives that are applied to the same data; and (4) methodological triangulation. Methodological triangulation, which is defined as the employment of more than two methods in studying the same phenomenon (Mitchell, 1986), is used in this thesis to answer the research hypotheses. Creswell and Miller recognise triangulation as a procedure for validation where researchers assess convergence among multiple sources of information to form themes in a study (Creswell and Miller, 2000). However the use of triangulation for convergence is criticised and categorised as being unrealistic. A practical suggestion by Mathison (1988) is to use triangulation to gain a deeper understanding of the research subject. The use of triangulation for completeness purposes is also supported by the literature particularly in areas such as accreditation, which is largely underexplored (Maxwell and Loomis, 2003). As documented by Denzin (1978, p.301), the within-method of methodological triangulation is the use of multiple methods within a single paradigm (quantitative or qualitative) for data collection and analysis of a specific phenomenon. We have used this method within the quantitative paradigm to increase the credibility of our research findings on accreditation. We have not restricted the outcomes of triangulation to achieving convergent findings but rather to develop a deeper understanding of accreditation. Methodological triangulation enables the researcher to generate rich data and thus gain a broader understanding of healthcare accreditation, in terms of its impact on both patient experience and clinical quality. The strengths of the time series analysis were able to compensate, in part, for the weaknesses of the cross-sectional study. As patient experience is a complex subject, the case study on patient experience further developed the researchers understanding of the influence of variables, other than accreditation, on patient experience measures. The results from the three components of this thesis were used to enhance, augment and clarify the results. The process for triangulation was as follows (Farmer, 2006; Rutherford *et al*., 2010; O'Cathain *et al*., 2010).

8.2.1.1 Identify research objectives and paradigm

The framework for this thesis was grounded in a positivist paradigm using quantitative research methodology. Creswell (2002) states, ‘A quantitative approach is one in which the investigator primarily uses post positive claims for developing knowledge (i.e., cause and effect thinking, reduction of specific variables and questions, use of measurement and observation of the test questions), employs strategies of inquiry such as experiments and surveys, and collects data on predetermined instruments that yield statistical data.’

A mixed method research design was used to answer the question; ‘does accreditation have an impact on hospital quality, clinical measures and patient experience?’ The research question was answered using three study components: 1) a case study of Al Noor Hospital to determine the predictors of positive patient experience other than that of accreditation; 2) the cross-sectional evaluation of the relationship between hospital accreditation and patient experience and 3) a time series analysis to assess the impact of accreditation on hospital quality using 27 quality measures.

8.2.1.2 Examine the results from the three thesis components.

The first component was a case study analysis of patient experience in Al Noor Hospital. A piloted, validated and reliable survey tool was developed. The patient experience survey was administered via face-to-face interviews of 391 patients. Patient demographic variables, stay characteristics and patient experience constructs were tested against five patient experience outcome measures using regression analysis. The predictors of positive patient experience were the patient demographics (age, nationality, health status), hospital stay characteristics (hospital treatment outcome) and patient experience constructs (care from nurses, care from doctors, cleanliness, pain management and quality of hospital food). A conceptual map of these relationships was developed. Recommendations were made on how hospital managers can improve patient experience as modifiable factors were identified.

The second component, using secondary data collected by GRMC, employed a cross-sectional design to evaluate the relationship between accreditation and patient experience found that accredited hospitals had significantly higher inpatient experience scores than non-accredited hospitals. There was no significant difference in the outpatient experience construct scores between the hospital groups. The hospital level variables, other than patient volume, were not correlated with patient experience.

The third component, time series analysis, demonstrated that although accreditation improved the quality performance of the hospital, this improvement was not sustained over the 3-year accreditation cycle. A life cycle theory was developed and tested against 23 variables over the accreditation cycle. The theory was consequently supported by empirical evidence. Recommendations for improvement of the accreditation process were made using the life cycle theory to substantiate these claims. Furthermore the Life Cycle Model and interrupted time series analysis was proposed as a strategic tool for healthcare managers to recognise and thus prevent the negative trends of the accreditation life cycle and sustain improvements gained from accreditation. The time series analysis has shown that accreditation has a positive impact on clinical quality measures in the time series analysis, which was not sustained over the accreditation cycle. The life cycle theory demonstrated that accreditation surveys increase compliance with quality measures in the pre-survey phase; this effect is not sustained over the accreditation life cycle.

8.2.1.3 Identify trends and converging themes

- Care from nurses, cleanliness, pain management, quality of food and care from doctors were predictors of patient experience in the patient experience analysis.
- These inpatient constructs were scored significantly higher in accredited hospitals compared with non-accredited in the cross-sectional study. However a conflicting finding was that there was no significant difference in the outpatient overall hospital ratings and patient experience constructs between accredited and non-accredited hospitals.
- The time series analysis demonstrated that accreditation improved 74% of the quality measures in the pre-survey phase although it was not sustained during the life cycle; the performance was still some 20% above the baseline. These measures included infection control measures and other process measures. This is largely due to the accreditation process itself and the involvement of healthcare staff in sustaining the improvement gained.

8.2.1.4 Summarise findings and draw conclusions

Triangulation enabled the researcher to use the research findings to support the hypotheses. Specific attention was paid to logical patterns that cut across the three research components and consideration was given to both supporting and conflicting findings. The JCI standards place emphasis on the improvement of processes such as infection control, communication among healthcare staff and nursing care. Cleanliness and nursing care were also predictors of patient experience and ranked highly by patients. This research supports accreditation's improvement of processes as demonstrated by improved compliance with quality measures and higher patient experience scores. This positive correlation between hospital accreditation and inpatient experience scores implies that these two variables are related. Although correlation between the inpatient experience scores and accreditation does not infer causation, managerial theory could be applied to suggest that the improvement in these very processes are important to patients as demonstrated by higher inpatient experience scores in accredited hospitals. However, such a link would need to be further studied in a controlled, longitudinal experiment to infer causation.

8.2.2 Research implications for healthcare accreditation and patient experience

The JCI standards were derived from the JCAHO standards that served as a quality framework in the United States. Thus many organisations in the Middle East question their applicability outside the United States. Determining whether there is empirical support for the implementation and benefits of these standards in different countries and cultures is critical to their credibility in healthcare organisations. Results from this study might contribute to allaying the doubts and concerns related to the effectiveness and benefits of applying the JCI standards. It also advocates that the health authorities adopt strategies and pass legislation with less hesitation and thereby encourage healthcare organisations to invest in such quality initiatives.

The thesis aimed at identifying the impact of JCI accreditation on the quality performance and patient experience in a healthcare organisation. At a micro level, the findings of this research demonstrate that a private hospital can use accreditation to target improvements in its services. These improvements include an increase in inpatient experience scores, while controlling for the other variables. At a macro-level, regulatory bodies can ascertain that investment in accreditation is appropriate provided hospitals sustain the improvement gained over the accreditation life cycle. If not, reviews into alternative quality interventions like public reporting systems of patient experience ratings, hospital rating systems and consumer reports need to be undertaken.

The outcome of this thesis provides policy makers, accrediting bodies, and consumers with more precise information about how the accreditation approach to quality in hospital settings relates to a range of hospital-level quality indicators and patient experience. This information could be used to facilitate the development of a national accreditation programme. Finally, this study also supports the legitimacy of hospital managers and clinicians decision in the pursuit of accreditation and methods to sustain the improvements gained.

The need for continuous improvement of quality and safety in the provision of patient care has become axiomatic. This thesis is important from a research perspective, as previously discussed healthcare accreditation, although commonly used to improve patient safety and quality, is still under-researched and under-theorised. This research is important as it adds to the evidence base of accreditation but also has policy and management implications. Proposals are made on how the accreditation process can be modified to ensure that improvement is sustained in between accreditation surveys. Policy recommendations have been made including rationalisation for the process of continuous survey readiness. This research serves to encourage healthcare managers to reconsider their position on accreditation as ‘being ready for the next patient and rather than the next survey’.

The thesis supports a change in the healthcare paradigm from treating patients as helpless observers to active participants in their care. The focus on patient experience does just that, ensuring that providers measure what patients’ value. However, healthcare providers need to take this a step further and design healthcare processes with -patients- for- patients. If we accept that this assertion is at least partly correct, then there are implications across nearly all policy realms to embrace the philosophy of patient-centred care. This philosophy was created to change the perspective of healthcare providers from designing processes to meet their needs as opposed to the needs of patients. Only the philosophically progressive providers will embrace this paradigm as not being inconsequential, spurious, or idealistic. Patient centered care and its essential characteristics of partnering with patients and families, of encouraging involvement, and of personalizing care, are commonly viewed as a threat to the traditional healthcare perspective where clinicians are the experts and patients are body parts to be fixed. For decades, the provision of patient-centered healthcare, patient involvement, a healing physical environment, food, spirituality, and so forth have largely fallen by the wayside when equated to the dire pressures of quality and patient safety, market competition and financial sustainability. Healthcare paradigms are shifting. The Institute of Medicine‘s 2001 seminal report *Crossing the Quality Chasm* identified patient-centred care as an fundamental base for quality and patient safety, challenging the conventional perspective: to one in which the *way* care is delivered is considered equally as important as the care itself. Patient experience surveys, exists as a standardised tool to evaluate the way care is provided from the patient perspective. It examines those aspects of the healthcare experience that mean the most to patients, including communication with nurses and physicians, cleanliness, pain management etc. Patient experience will likely become a basis for reimbursement, effectively advancing patient-centred care from the ‘nice to have’ to a business imperative. The patient, our customer, should drive the design and delivery of care. For this to happen, all healthcare staff - from the boardroom to the front line - need to engage patients and the public every day in making decisions. Only then will we make patients' experiences really count.

Not only is healthcare patient-centric but it is an extraordinarily people-centric industry. The common and inextricable link between sustaining the positive impact of accreditation and ensuring positive patient experiences is the interaction among healthcare staff. This study has demonstrated that the greatest influences on the patient experience are the individuals (doctors and nurses) who comprise the hospital staff. However, whether at the bedside or in the back office, in a patient-centred hospital, every staff member contributes to the overall patient experience. Every interaction is an opportunity for caring, support and compassion. Clearly, the patient and staff experiences are intimately intertwined. Employee behaviours, staff engagement, leadership and governance structures are critical factors to the success of accreditation, patient experience and patient centred care. Healthcare is fragmented, given the numerous services with which many patients interact. Thus the future of healthcare improvement is underpinned by a 'whole-system' perspective and not by discrete patient safety and quality tools.

Internationally patient experience data have not been used satisfactorily to drive improvements in healthcare quality. In the UK, the government's vision is for patients to drive the design and delivery of high-quality healthcare services by 'putting patient experience centre stage' (Lord Darzi, 2008; UK Department of Health, 2009) and a number of regulatory requirements are currently in place to meet this aim. In the UAE, healthcare organisations still predominantly use patient satisfaction data to gather patient feedback. Hospitals in the 21st century mostly use separate evaluative processes for quality, clinical effectiveness and patient experience, with a focus on individual indicators, as has been described in the Danish accreditation model (Hassan and Kanji, 2007). The application of a holistic approach will allow for an assessment of the organisation's progress from multiple dimensions to determine whether the desired performance standards and quality levels are being achieved on all organisational levels. A recent analysis (Hinchcliff *et al.*, 2013), highlighted that policymakers and regulators should ensure that accreditation and other regulatory measures mutually reinforce, rather than overlap, duplicate or conflict with each other. The author proposes that both accreditation and patient experience surveys are important tools for improving and ensuring quality. Use of these tools in combination may be a powerful strategy to meet both organisational and patient needs. Accreditation can improve care processes to meet the highest quality standards from an organisational perspective while the use of patient experience surveys will ensure that these processes indeed improve direct care from a patient's perspective. While this study is an indication that this powerful relationship exists, this is certainly an important subject for future research. Suggestions for future research will be elaborated on in the subsequent section.

8.3 Suggestions for future research

A deficiency of rigorous and quality evidence on the impact of healthcare accreditation has been underlined in this thesis and the value of randomised trials increasingly advocated in the literature. However, it is also acknowledged that randomisation is not always feasible or politically acceptable (Ranson *et al*., 2006). The use of time series analysis using longitudinal data series before and after an intervention can also deliver compelling results and such data are often easily accessible (Grimshaw *et al*., 2003). The Cochrane Effective Practice and Organisation of Care Review Group (2002) and the Effective Practice and Organisation of Care Group (EPOC) of the Cochrane Collaboration have listed three different types of study designs in its inclusion criteria. The first is the randomised experimental design and the second being two types of quasi-experimental designs, which are controlled before and after studies and interrupted time-series (ITS) studies. Despite its appealing features, ITS is not a commonly used design in healthcare quality and accreditation research. This is the first study anywhere to examine the impact of accreditation using interrupted time series analysis using segmented regression analysis. Thus, the author recommends use of this study design for future healthcare research regarding the evaluation of quality interventions because of the strength of the design and accessibility of data. The majority of the studies reviewed simply compared data from one or two surveys carried out before and after accreditation was enacted, thus failing to capture and remove the confounding effects of underlying variables and the dynamics of the process when investigating the impact of accreditation. The technique of interrupted time series analysis used in this thesis has proved a useful method to assess changes in measures of accreditation in healthcare, taking into account long term trends and seasonal variation in the outcome variables and thus strengthening the conclusions drawn about the impact of accreditation.

Accreditation may not be a panacea for all ills in the healthcare industry but as stated by Wendy Nicklin, President and CEO, Accreditation Canada (2013), 'Accreditation is a risk mitigation strategy, a performance measurement tool, a management tool for diagnosing strengths and areas for improvement and provides key stakeholders with an unbiased third-party review.' Recommendations have been made in this study to further improve on the effectiveness of the accreditation process and prevent the negative life cycle effect. These include unannounced surveys, intra-cycle self assessments and benchmarking of accredited facilities. These interventions need to be investigated to determine their benefit of sustaining improvement during the accreditation cycle.

Insufficient research has been completed on the subjects of accreditation's impact on quality measures and patient experience. This study provides preliminary empirical results on the relationship of accreditation and patient experience that has not been previously explored. As such, it opens many doors to build upon the results and explore the depths of this topic. While many research papers exist on patient satisfaction, only a few have examined the influence of accreditation. To the author's knowledge, no investigations have been published on accreditation and patient experience at the time of writing. As accreditation is used as a marketing tool for medical tourism and an instrument for public recognition of quality, this relationship is imperative. A longitudinal research design in a controlled environment would assist in inferring causation rather than merely alluding to association, as patient experience is a complex subject. As our work has shown, patient experience is an intrinsic component of quality. It is multidimensional with many variables and predictors. As patient experience indicates the level of quality delivered, accreditation programs need to include this dimension of performance in its standards. Further research needs to examine this link and whether inclusion of patient experience in accreditation will improve hospital quality as measured by patients.

Patient experience is a fundamental component of quality. It has bottom line implications in terms of loyalty of patients, referrals, reimbursement and staff turnover.

Further research into the determinants of patient experience in the Middle East needs to be initiated. As demonstrated by our results, nationality is a predictor of patient experience and thus the patient characteristics need to be analysed when evaluating improvement initiatives. Secondly, interventions to impact on the modifiable factors such as doctors and nurses attitudes need to be evaluated. The patient-centred approached should be embraced for 21st century healthcare provision. Further research into the impact of patient centred care on quality, employee engagement and patient experience is warranted.

These recommendations are not intended to be an exhaustive list but indications for further exploration that have emerged from this thesis and is reportedly under researched in the literature review. The findings of this thesis usher in the possibility to unlock the potential of the combined use of accreditation and patient experience to improve healthcare quality for the patients it serves. The need for change in the healthcare delivery process is imbued by technology changes, the advent of more complex epidemics and increasing public awareness of patient safety events. The international healthcare landscape, with rising costs, increasing quality pressures and competition make the field of healthcare quality, accreditation and patient experience fertile grounds for further research. All of which serves the noble undertaking of making healthcare a safer place for its most important stakeholder - the patients.

9. References:

Abdul Kareem, A., Aday, L.A., Walker, G.M. (1996). Patient satisfaction in government health facilities in the state of Qatar. *Journal of Community Health*, 21, 5-12.

ACHS. (2002). The EQuIP guide: a framework to improve quality and safety in healthcare. Sydney: Australian Council on Healthcare Standards.

Agrizzi, D. (2008). Assessing English hospitals: contradiction and conflict. *Journal of Accounting and Organisational Change,* 4**,** 222-242.

Aharony, L. and Strasser, S. (1993). Patient satisfaction: what we know about and what we still need to explore. *Medical Care Review* 50(1), 49–79.

Aiken, L. H., Clarke, S. P., Sloane, D. M., Sochalski, J. and Silber, J. H. (2002). Hospital nurse staffing and patient mortality, nurse burnout, and job dissatisfaction. *Journal of American Medical Association, 288*(16), 1987-1993.

Aiken, L. H., *et al*. (2012). Patient safety, satisfaction, and quality of hospital care: cross-sectional surveys of nurses and patients in 12 countries in Europe and the United States. *BMJ*, 344(22), 1717- 1723.

Alaiban KM, Al-Omar B, Narine L, Al-Assaf AF, Javed F. (2003). A survey assessing patient satisfaction at public and private healthcare facilities in Riyadh, Saudi Arabia. *Ann Saudi Med*. 23:417–9.

Al-Doghaither, A.H., Abdelrhman, B.M., Saeed, A.A. (2000). Patients' satisfaction with physicians' services in primary healthcare centres in Kuwait City, Kuwait. *The Journal of the Royal Society for the Promotion of Health*, 120 (3), 170-4.

Al-Eisa, Al-Mutar (2005). Patients' satisfaction with primary healthcare services at capital health region, Kuwait. *Middle East. J. Fam. Med*., 3(2), 10-16.

Al-Faris, E., Khoja, T., Falouda, M., Saeed, A. (1996). Patients' satisfaction with accessibility and services offered in Riyadh Health Centers. *Saudi Medical Journal*, 17 (1),11-17.

Al-Sakkak MR, Al-Nowaiser NA (2008). Patient satisfaction with primary healthcare services offered in Riyadh health centres. *Saudi Medical Journal*, 29(3): 432-436.

Al-Shamekh, A. (1992). Determinants of patient general satisfaction with primary healthcare services in Riyadh, Saudi Arabia. PhD dissertation, University of Pittsburgh, PA.

Anonymous (2001) Module 5, time series analysis. In: Anonymous, ed. Pharmacoepidemiology: behavioural and cultural themes. Newcastle: Center for Clinical Epidemiology and Biostatistics Australia.

Ammar W., Khalife J., El-Jardali F., Romanos J., Harb H., Hamadeh G. and Dimassi H. (2012). Dubai - Dubai hospitals given deadline to meet global standards. *International Journal of Health Care Quality Assurance*, 25 (6). 432-439

Appleyard G., John Ramsay and Associates Pty Ltd: (2008). Cost analysis of safety and quality accreditation in the Australian health system. Sydney: Australian Commission for Safety and Quality in Health Care.

Arce H. (1999). Accreditation: the Argentine experience in the Latin American region. *International Journal for Quality in Health Care.* 11:425–428.

Arentz, J. E. and Arentz, B. B. (1996). The development and application of a patient satisfaction measurement system for hospital-wide quality improvement. *International Journal of Quality in Health Care, 8*(6)*,* 555-566.

Asteriou D, Hall SG. (2007) Applied econometrics: a modern approach using EViews and Microfit. Basingstoke [England]; New York: Palgrave Macmillan.

Avery C, Ehrens B. (1999). National Survey of NHS Patients: General Practice 1998. London. Department of Health. *BMC Health Services Research* 13:505.

Babbie, E. (2004). *The practice of social research.* Belmont, CA: Wadsworth.

Baker G.R and Norton P. (2003). Patient safety and healthcare error in the Canadian healthcare system: a systematic review and analysis of leading practices in Canada with reference to key initiatives elsewhere. Winnipeg: Health Canada.

Barker, K.N., Flynn, E.A., Pepper, G.A., Bates, D.W., and Mikeal, R.L. (2002). Medication errors observed in 36 healthcare facilities. *Archives of Internal Medicine, 162*: 1897 – 1903.

Barr, D. A. and P. Vergun (2000). Using a new method of gathering patient satisfaction data to assess the effects of organizational factors on primary care quality. *Joint Commission Journal of Quality Improvement*, 26 (12), 713-23.

Beck, S. L., Towsley, G. L., Berry, P. H., Lindau, K., Fields, R. B. and Jensen, S. (2010). Core aspects of satisfaction with pain management: Cancer patients' perspectives. *Journal of Pain and Symptom Management, 39*(1), 100-115

Belsley, D.A., Kuh, E. and Welsch, R.E. (1980). *Regression diagnostics: Identifying influential data and sources of collinearity*. New York: John Wiley and Sons.

Berwick DM, Leape LL. Reducing errors in medicine. *BMJ*. 1999; 319:136–137

Berwick D., Calkins D., McCannon C., *et al*. (2006). The 100 000 lives campaign: setting a goal and a deadline for improving healthcare quality. *JAMA*; 295:324-7.

Berger, B., M. Lenz, and I. Muhlhauser (2008). [A satisfied patient--a good doc? To what extent is patient satisfaction an indicator of quality in general practice? A systematic review]. *Z Evid Fortbild Qual Gesundhwes*, 102 (5), 299-306.

Bertakis, K. D., Azari, R., Helms, L. J. Callahan, E. J., Robbins, J. A. (2000). Gender differences in the utilisation of healthcare services. *The Journal of Family Practice*, 49(2), 147-152.

Bertakis, K. D., P. Franks, and R. Azari (2003). Effects of physician gender on patient satisfaction. *J Am Med Womens Assoc*, 58 (2), 69-75

Bo Hamra, S., Al-Zaid, B. (1999). Users satisfaction of level of service in the primary healthcare clinics in Kuwait: field study. *Journal of Studies of the Gulf and the Arabian Peninsula*, 24 (95).

Borghans I., Kleefstra S. M., Kool R. B. and Westert G. P. (2012). Is the length of stay in hospital correlated with patient satisfaction? *Int J Qual Health Care* 24 (5): 443-451

Bovier, P. A. and Perneger T. V. (2003). Predictors of work satisfaction among physicians. *Eur J Public Health*, 13 (4), 299-305.

Bowers, M. R. and Kiefe C. I. (2002). Measuring health care quality: comparing and contrasting the medical and the marketing approaches. *Am J Med Qual*, 17 (4), 136-44.

Bowling, A. (2002). *Research methods in health: Investigating health and health services.* Buckingham: Open University Press.

Box G.E.P., Jenkins G.M. (1976).Time series analysis: forecasting and control. San Francisco: Holden-Day.

Box G.E.P., Jenkins G.M, Reinsel G.C. (1994) Time series analysis, forecasting and control. Third edition. Englewood Cliffs: Prentice Hall.

Braithwaite J, Finnegan T, Graham E, Degeling P, Hindle D, Westbrook M. (2004). How important are safety and quality for clinician managers? Qualitative evidence from triangulated studies. *Clinical Governance: an International Journal.* 9(1):34-41

Braithwaite, J., Westbrook, J., Pawsey, M., Greenfield, D., Naylor, J., Iedema, R., Runciman, B., Redman, S., Jorm, C., Robinson, M., Nathan, S., Gibberd, R., (2006). Study Protocol: A Prospective, Multi-Method, Multi-Disciplinary, Multi-Level, Collaborative, Social-Organisational Design for Researching Health Sector Accreditation. *BMC Health Services Research,* 6, 113

Braithwaite J, Westbrook M, Travaglia J, *et al*. (2007). Are health systems changing in support of patient safety? A multi-methods evaluation of education, attitudes and practice. *Int J Health Care Qual Assur*. 20:585-601.

Braithwaite, J., Greenfield, D., Westbrook, J., *et al*., (2010) Health Service Accreditation as a predictor of clinical and organisational performance: a blinded, random, stratified study. *Qual Saf Health Care.* 19: 14-21

Braithwaite J, Shaw CD, Moldovan M, Greenfield D, Hinchcliff R, Mumford V, Kristensen MB, Westbrook J, Nicklin W, Fortune T, Whittaker S., (2012). Comparison of health service accreditation programs in low- and middle-income countries with those in higher income countries: a cross-sectional study. *Int J Qual Health Care*, 24:568–577.

Brekke M, Hjortdahl P, Kvien TK. (2001). Involvement and satisfaction: a Norwegian study of healthcare among 1,024 patients with rheumatoid arthritis and 1,509 patients with chronic noninflammatory musculoskeletal pain. *Arthritis Care Res*; 45:8–15.

Broadbent, J. and Laughlin, R. (2009). Performance management systems: A conceptual model. *Management Accounting Research,* 20**,** 283-295.

Callahan, E. J., *et al*. (2000). The influence of patient age on primary care resident physician-patient interaction. *J Am Geriatr Soc*, 48 (1), 30-35.

Cann, T., and Gardner, A. (2012). Change for the better: An innovative model of care delivering positive patient and workforce outcomes. *Collegian, 19*, 107-113.

Carmel S. (1985). Satisfaction with hospitalisation: a comparative analysis of three types of services. *Soc Sci Med*. 21:1243–9.

Carr-Hill, R. (1992). The measurement of patient satisfaction. *Journal of Public Health Medicine* 14(3), pp. 236–49.

Chandra A., Glickman S.W., Ou F.S., Peacock W.F., McCord J.K, Cairns C.B., *et al*.(2009). An analysis of the association of society of chest pain centres accreditation to American college of cardiology/American heart association non-st-segment elevation myocardial infarction guideline adherence. *Ann Emerg Med*.54:17–25.

Chang, L. (2006). Managerial Responses to Externally Imposed Performance Measurement in the NHS: An Institutional Theory Perspective. *Financial Accountability and Management,* 22**,** 63-85.

Charles, C., *et al*. (1994). How was your hospital stay? Patients' reports about their care in Canadian hospitals. *CMAJ*, 150 (11), 1813-22.

Chatfield, C. (1989). *The Analysis of Time Series: An Introduction*. (Fourth Edition). London: Chapman and Hall.

Chatfield, Chris (2000), 'Basics of Time-Series Analysis', *Time-Series Forecasting* (Chapman and Hall/CRC),

Chen J, *et al. (2003)*: JCAHO accreditation and quality of care for acute myocardial infarction**.** *Health Aff (Millwood)*, 22(2): 243-54.

Chuang, S. and Inder, K. (2009). An effectiveness analysis of healthcare systems using a systems theoretic approach. *BMC Health Services Research,* 9**,** 195-205.

Chen-Tan L., Albertson G.A., Schilling L.M. *et al*. (2001) Is patients' perception of time spent with the physician a determinant of ambulatory patient satisfaction? *Arch Intern Med;* 161:1437–42.

Chow, A., *et al*. (2009). Patient-reported outcome measures: the importance of patient satisfaction in surgery. *Surgery*, 146 (3), 435-43.

*C*huang S., Howley P. P. and Hancock S, (2013). Using clinical indicators to facilitate quality improvement via the accreditation process: an adaptive study into the control relationship *International Journal for Quality in Health Care*. 1–7

Chung, K. C., *et al*. (1999). Predictors of patient satisfaction in an outpatient plastic surgery clinic. *Ann Plast Surg*, 42 (1), 56-60.

Cleary, P. D. and. McNeil B. J. (1988), Patient satisfaction as an indicator of quality care. *Inquiry*, 25 (1), 25-36.

Cleary P.D., Keroy L., Karapanos G. *et al*. (1989). Patient assessments of hospital care. *QRB Qual Rev Bull*; 15:172–9

Cleary P.D., Edgman-Levitan S., Roberts M., Moloney T.W., McMullen W., Walker J.D., *et al*. (1991). Patients evaluate their hospital care: a national survey. *Health Aff* (Millwood); 10:254–67

Cleary P.D., Edgman-Levitan S., Walker J.D. *et al*. (1993). Using patient reports to improve medical care: a preliminary report from 10 hospitals. *Qual Manag Health Care* 1993; 2:31–8.

Cleary P.D., Edgman Levitan S. (1997). Health care quality—incorporating consumer perspectives. *J Am Med Assoc*; 278:1608–12.

Clegg S., Hardy C. (1996). Introduction: organisations, organisation and organising. In: Clegg S, Hardy C, Nord W, Eds. Handbook of Organisation Studies. London: Sage. 1-28.

Cochrane Effective Practice and Organisation of Care Review Group. (2002). The data collection checklist. Online at: http://epoc.cochrane.org/sites/epoc.cochrane.org/files/uploads/datacollectionchecklist.pdf, accessed 5 January 2012.

Collopy B.T. (2000). Clinical indicators in accreditation: an effective stimulus to improve patient care. *Int J Qual Health Care*. 12:211-16.

Collopy B.T., Williams J., Rodgers L., *et al*. (2000). The ACHS Care Evaluation Programme: a decade of achievement. *J Qual Clin Pract*.20:36-41.

Commission for Health Improvement. (2004). Unpacking the Patients' Perspective: Variations in NHS Patient Experience in England.

Cook T.D., Campbell D.T. (1979). Quasi-experimentation. Design and analysis issues for field settings. Boston, MA: Houghton Mifflin Company.

Coulter A, Magee H. (2003) The European Patient of the Future. Open University Press.

Counte M. A., and Meurer S. (2001). Issues in the assessment of continuous quality improvement implementation in healthcare organisations. *International Journal for Quality in Health Care, 13*, 197-207.

Cowan C., Catlin A., Smith C., and Sensenig A. (2004). National Health Expenditures, 2002. *Health Care Financing Review. 25*(4), 143-166.

Coyle J. and Williams B. (1999). Seeing the wood for the trees: Defining the forgotten concept of patient dissatisfaction in the light of patient satisfaction research. *International Journal of Health Care Quality Assurance incorporating Leadership in Health Services, 12*(6-7), 1-9.

Creswell J. W., and Miller D. L. (2000). Determining validity in qualitative inquiry *Theory into Practice, 39*(3), 124-131

Crocker L. and Algina J. (1986). *Introduction to Classical and Modern Test Theory,* Holt, Reinhart and Winston, New York, NY

Crow R., Gage H., Hampson S., Har, J., Kimber A., Storey L. and Thomas H. (2002). The measurement of satisfaction with healthcare: implications for practice from a systematic review of the literature. *Health Technology Assessment*, 6 (32) 231-244.

Da Costa D., Clarke A., Dobkin P., Senecal J., Fortin P., Danoff D. and Esdaile J. (1999). The relationship between health status, social support and satisfaction with medical care among patients with systemic lupus erythematous. *International Journal for Quality in Health Care, 11*(3), 201-207.

Daniel A., Burn R., Horarik S. (1999). Patients complaints about medical practice. *Med J Aust;* 170: 598-602.

Danielsen K., Garratt A. M., Bjertnaes O. and Pettersen K. I. (2007). Patient experiences in relation to respondent and health service delivery characteristics: A survey of 26,938 patients attending 62 hospitals throughout Norway. *Scandinavian Journal of Public Health, 35*(1), 70-77.

Darby C., Hays R.D., Kletke P. (2005). Development and evaluation of the CAHPS hospital survey. *Health Services Research*; 40:1973-1976.

Dean Beaulieu N., Epstein A.M. (2002). National Committee on Quality Assurance health plan accreditation: predictors, correlates of performance and market impact. *Med Care*; 40:325-37.

Department of Health. (2001). Building a safer NHS for patients: implementing an organisation with a memory. London: Department of Health.

Department of Health, (2009). The Point of Care, Measures of patients' experience in hospital: purpose, methods and uses. London: Department of Health

Department of Health, (2009). Report on self reported experience of patients from black and minority ethnic groups. London: Department of Health.

de Vries E.N., Ramrattan M.A., Smorenburg S.M., Gouma D.J., Boermeester M.A. (2008) The incidence and nature of in-hospital adverse events: a systematic review. *Qual Saf Health Care,* 17:216–223.

Denzin N. K. (1970), The *Research Act in Sociology*. Chicago: Aldine Publishing.

Denzin, N. K. (1978). *The research act: A theoretical introduction to sociological methods.* New York: McGraw-Hill.

DiMatteo, M. R., *et al*. (1980). Predicting patient satisfaction from physicians' nonverbal communication skills. *Med Care*, 18 (4), 376-87.

DiMatteo M.R. (1994). Enhancing patient adherence to medical recommendations. *JAMA*: 271:79-83

DiMatteo, M. R. and R. Hays (1980). The significance of patients' perceptions of physician conduct: a study of patient satisfaction in a family practice center. *J Community Health*, 6 (1), 18-34.

Dickey D. and Fuller, W.A. (1979). Distribution of the estimates for autoregressive time series with a unit root. *Journal of the American Statistical Association*, 74: 427-31.

Dillman D.A., Mail and telephone surveys: the total design method. New York: Wiley and Sons; 1978.

Doering G. T. (1998). Customer care. Patient satisfaction in the prehospital setting. *Emerg Med Serv*, 27 (9), 69, 71-74.

Donabedian A. (1966). Evaluating the quality of medical care. *Milbank Mem Fund Q*; 44: 166–206.

Donabedian A. (1980). *The definition of quality and approaches to its assessment*. Ann Arbor: Michigan Health Administration Press.

Donabedian A. (2003). *An introduction to quality assurance in healthcare.* New York: Oxford University Press.

Donahue K. T. and Vanostenber, P. 2000. Joint Commission International Accreditation: relationship to four models of evaluation. *International Journal for Quality in Health Care*, 12, 243-246.

Draper, M. and Hill, S. (1995), *The role of patient satisfaction surveys in a national approach to hospital quality management*, Australian Government Publishing Service, Canberra.

Duckett S.J. (1983). Changing hospitals: The role of hospital accreditation, *Social Sciences and Medicine* 17(28): 1573–79.

Eckhardt-Abdulla, R. (2007), '[Evaluation of patient satisfaction as quality assurance measure in the hospital].', *Pflege*, 20 (3), 137-47.

Edelstein L. (1943) The Hippocratic Oath, Supplements to the Bulletin of the History of Medicine. Johns Hopkins University Press.

El-Jardali, F., Jamal, D., Dimassi, H., Ammar, W., Tchaghchaghian, V., (2008) The Impact of Hospital Accreditation on Quality of Care: Perception of Lebanese Nurses *International Journal for Quality in Health Care,* 20 (5), 363-371.

Enders W. (2009). *Applied Econometric Time Series*. Hoboken, New Jersey: John Wiley and Sons.

Fairbrother, G. and M. Gleeson (2000). EQuIP accreditation: feedback from a Sydney teaching hospital. *Aust Health Rev*, 23 (1), 153-62.

Farmer, T. (2006). Developing and Implementing a Triangulation Protocol for Qualitative Health Research. *Qualitative Health Research*, 16 (3), 377-94.

Ferrans, C. E., M. J. Powers, and C. R. Kasch (1987). Satisfaction with health care of hemodialysis patients. *Res Nurs Health*, 10 (6), 367-74.

Field A. (2005). Discovering statistics using SPSS (2^{nd} edition). London, UK: Sage publications.

Findik, U. Y., Unsar, S. and Sut, N. (2010). Patient satisfaction with nursing care and its relationship with patient characteristics. *Nursing and Health Sciences*, *12*(2), 162-169.

Finkelstein B.S., Harper D.L., Rosenthal G.E. (1998). Does length of hospital stay during labour and delivery influence patient satisfaction? Results from a regional study. *Am J Manag Care*. 4:1701–8.

Flocke, S. A. (1997). Measuring attributes of primary care: development of a new instrument. *J Fam Pract*, 45 (1), 64-74.

Flodgren G., Pomey M.P., Taber S.A, Eccles M.P. (2011). Effectiveness of external inspection of compliance with standards in improving healthcare organisation behaviour, healthcare professional behaviour or patient outcomes. *Cochrane Database of Systematic Reviews*, Issue 11. Art. No.: CD008992. DOI: 10.1002/14651858.CD008992.pub2.

Flotta, D., *et al*. (2012), 'Appraising hospital performance by using the JCAHO/CMS quality measures in Southern Italy.', *PLoS One*, 7 (11) 489-513.

Fong J, Marsh GM, Stokan LA *et al*. (2008). Hospital quality performance report: an application of composite scoring. *Am J Med Qual*. 23:287–95.

Fowler, P. B. (2001), Changing relationship between the public and the medical profession. *J R Soc Med*, 94 (8), 425-432.

Franzén, C., Björnstig, U., Jansson, L., Stenlund, H. and Brulin, C. (2008). Injured road users' experiences of care in the emergency department. *Journal of Clinical Nursing*, *17*(6), 726-734.

Gardner, G., Woolett, K., Daly, N., and Richardson, B. (2009). Measuring the effect of patient comfort rounds on practice environment and patient satisfaction. A pilot study. *International Journal of Nursing Practice, 15*(4), 287-293.

Grafen, A. and Hails, R. (2002) *Modern Statistics for the Life Sciences*. Oxford University Press, Oxford.

Garroutte, E. M., *et al*. (2004). Patient satisfaction and ethnic identity among American Indian older adults. *Soc Sci Med*, 59 (11), 2233-44.

Geiger, N. (2012). On tying Medicare reimbursement to patient satisfaction surveys. *American Journal of Nursing*, 112(7), 11.

Glind, I., Roode, S. and Goossensen, A. (2007). Do patients in hospitals benefit from single rooms? A literature review. *Health Policy*, *84*(2-3), 153-161.

Glickman, S., Boulding, W., and Manary, M. (2010). Patient Satisfaction and its relationship with clinical quality and inpatient mortality in acute myocardial infarction. *Circulation: Cardiovascular Quality and Outcomes, 3*(2), 188-195.

Gillings, D, Makuc, D, Siegel, E (1981). Analysis of interrupted time series mortality trends: an example to evaluate regionalised perinatal care. *American Journal of Public Health*, 71, 38–46.

Giraud, A. 2001. Accreditation and the quality movement in France. *Quality and Safety in Health Care,* 10 (2), 111-116.

Goodacre, S. W. *et al*., (2004). Patient and primary care physician satisfaction with chest pain unit and routine care. *Acad Emerg Med*, 11 (8), 827-33.

Greco M, Sweeney K, Brownlea A, *et al*. (2001). The practice accreditation and improvement survey (PAIS). What patients think. *Aust Fam Physician*. 30:1096-100.

Greenfield, D., Travaglia, J., Braithwaite, J., and Pawsey, M. (2007). Unannounced surveys and tracer methodology: literature review. A report for the Australian accreditation research network: examining future healthcare accreditation research. Sydney: The Centre for Clinical Governance Research in Health, Faculty of Medicine, University of New South Wales.

Greenfield D, Braithwaite J. (2007). A review of health sector accreditation research literature. Sydney: Centre for Clinical Governance Research, The University of New South Wales.

Greenfield D, Travaglia J, Braithwaite J, *et al*. (2007). An analysis of the health sector accreditation literature. A report for the Australian Accreditation Research Network: examining future healthcare accreditation research. Sydney: Centre for Clinical Governance Research, The University of New South Wales.

Greenfield, D., Braithwaite, J., (2008) Health Sector Accreditation Research: A Systematic Review *International Journal for Quality in Health Care,* 20 (3), 172-183.

Greenfield, D. and Braithwaite, J. (2009). Developing the evidence base for accreditation of healthcare organisations: a call for transparency and innovation. *Quality and Safety in Health Care* 18; pp 162 – 163.

Greenfield, D., Pawsey, M., Naylor, J., Braithwaite, J., (2009) Are accreditation surveys reliable? *International Journal of Health Care Quality Assurance,* 22 (2), 105-116.

Greene, M. G. *et al*., (1994). Older patient satisfaction with communication during an initial medical encounter. *Soc Sci Med*, 38 (9), 1279-88.

Greenfield, D. *et al*., (2012). A multimethod research investigation of consumer involvement in Australian health service accreditation programmes: the ACCREDIT-SCI study protocol. *BMJ Open*, 2 (5),

Greenfield, D. *et al*., (2012). An empirical test of short notice surveys in two accreditation programmes. *Int J Qual Health Care*, 24 (1), 65-71.

Greenfield, D., *et al*. (2012). The standard of healthcare accreditation standards: a review of empirical research underpinning their development and impact. *BMC Health Serv Res*, 12, 329-335.

Griffith, J.R., Knutzen, S.T., Alexander, J.A., (2002) Structural versus Outcomes Measures in Hospitals: A Comparison of Joint Commission and Medicare Outcomes Scores in Hospitals *Quality Management in Health Care*, 10 (2), 29-38.

Grimshaw J, Alderson P, Bero L. *et al*. (2003). Study designs accepted for inclusion in EPOC reviews. *EPOC Newsletter*, March 2003. Cochrane Effective Practice and Organisation of Care Review Group. Online at: http://epoc.cochrane.org/newsletters.

Gross D, Zyzanski S, Borawaski E, Cebul R, Stange K. (1998). Patient satisfaction with time spent with their physician. *J Fam Pract* 47: 133-137.

Gross. P.A., Braun, B.I., Kritchevsky, S.B., Simmons, B.P., (2000). Comparison of Clinical Indicators for Performance Measurement of Health Care Quality: A Cautionary Note, *Clinical Performance and Quality Health Care,* 8 (4), 202-211.

Haase, I., Lehnert-Batar, A., Schupp, W., Gerling, J. and Kladny, B. (2006). Factors contributing to patient satisfaction with medical rehabilitation in German hospitals. *International Journal of Rehabilitation Research*, *29*(4), 289-294.

Hall, J. and Dornan, M. (1988). Meta-analysis of satisfaction with medical care: description of research domain and analysis of overall satisfaction levels. *Soc Sci Med* 27(6), 637–44.

Hall, J. A. and M. C. Dornan (1988). What patients like about their medical care and how often they are asked: a meta-analysis of the satisfaction literature. *Soc Sci Med*, 27 (9), 935-39.

Hall, J. A. and Dornan, M. C. (1990). Patient sociodemographic characteristics as predictors of satisfaction with medical care: a meta-analysis, *Social Science and Medicine, 30*(7), 811-818.

Hall J.A., Milburn M.A., Roter D.L., and Daltroy L.M. (1998). Why are sicker patients less satisfied with their medical care? Tests of two explanatory models. *Health Psychol,* 17 (1), 70-5

Hall J.A, Milburn M.A., Epstein A.M. (1993) A causal model of health status and patient satisfaction with medical care *Med Care* 1; 89-94.

Hall, J. A., *et al*. (2002). Liking in the physician--patient relationship. *Patient Educ Couns*, 48 (1), 69-77.

Hanna, M., Gonzalez-Fernandez, M., Barrett, A., Williams, K and Pronovost, P. (2012). Does patient perception of pain control affect patient satisfaction across surgical units in a tertiary teaching hospital? *American Journal of Medical Quality, 27(*5), 411-416.

Haraden C, Resar R (2004) Patient flow in hospitals: understanding and controlling it better. *Front Health Serv Manag*; 20:3–15

Harmsen, J. A., *et al*. (2008). Patients' evaluation of quality of care in general practice: what are the cultural and linguistic barriers? *Patient Educ Couns*, 72 (1), 155-62.

Hargraves J.L., Wilson I.B., Zaslavsky A.M. *et al*. Adjusting for patient characteristics when analysing reports from patients about hospital care. *Med Care* 2001; 39:635–41.

Centers for Medicare and Medicaid Services. Mode and patient mix adjustment of the CAHPS Hospital Survey (HCAHPS), April 30, 2008 [paper on the Internet]. http://www.hcahpsonline.org/modeadjustment.aspx (14 December, 2010, date last accessed).

Harris-Kojetin, L. D., *et al.* (1999). The use of cognitive testing to develop and evaluate CAHPS 1.0 core survey items. Consumer Assessment of Health Plans Study. *Med Care*, 37 (3 Suppl), 10-21.

Hays, R. D., *et al*. (1999). Psychometric properties of the CAHPS 1.0 survey measures. Consumer Assessment of Health Plans Study. *Med Care*, 37 (3 Suppl), 22-31.

Healthcare Commission (2006). Variations in Patient Experience in England: Analysis of the Healthcare Commission's 2004/05 National Patient Surveys. London: Healthcare Commission.

Heaton, C. (2000). External peer review in Europe: an overview from the ExPeRT project. *International Journal for Quality in Health Care, 12*(3): 177 – 182.

Hekkert KD, Cihangir S, Kleefstra SM *et al*. (2009). Patient satisfaction revisited: a multilevel approach. *Soc Sci Med*; 69:68–75.

Hsieh, M.O. and Kagle, J. D. (1991). Understanding patient satisfaction and dissatisfaction with healthcare. *Health and Social Work*, *16*(4), 281-290.

Helbig M. *et al., (2006).* Quality assessment according to DIN EN ISO 9001:2000: Certification in a university ENT department**.** *HNO.* 54(12): 922-8.

Heje, H. N., R. Gut, and P. Vedsted (2009), '[Patient evaluation of health care].', *Ugeskr Laeger*, 171 (20), 1666-70.

Henderson, A., Caplan, G. and Daniel, A. (2004). Patient satisfaction: The Australian patient perspective. *Australian Health Review, 27*(1), 73-83.

Hendriks, A. A., *et al*. (2002), 'Reliability and validity of the Satisfaction with Hospital Care Questionnaire.', *Int J Qual Health Care*, 14 (6), 471-82.

Hendriks, A. A. J., Smets, E. M. A., Vrielink, M. R., Van Es, S. Q. and De Haes, J. C. J. M. (2006). Is personality a determinant of patient satisfaction with hospital care? *International Journal for Quality in Health Care, 18*(2), 152-158.

Heuer A.J. (2004). Hospital accreditation and patient satisfaction: testing the relationship. *Journal Healthcare Quality*. 26:46-51.

Heyland, D. K., *et al*. (2002). Family satisfaction with care in the intensive care unit: results of a multiple center study. *Crit Care Med*, 30 (7), 1413-18.

Heyland, D. K., *et al*. (2005). End-of-life care in acute care hospitals in Canada: a quality finish? *J Palliat Care*, 21 (3), 142-50.

Hickson G.B.C, Clayton E.W., Entman S. S., *et al*., (1994) Obstetricians' prior malpractice experience and patients' satisfaction with care. *JAMA*. 272:1583-1587

Hinchcliff, R., *et al*. (2012). Evaluation of current Australian health service accreditation processes (ACCREDIT-CAP): protocol for a mixed-method research project. *BMJ Open*, 2 (4)

Hinchcliff, R., *et al*. (2012). Narrative synthesis of health service accreditation literature. *BMJ Qual Saf*, 21 (12), 979-91.

Hinchcliff R. Greenfield D., Westbrook J., Pawsey M., Mumford V. and Braithwaite J. (2013). Stakeholder perspectives on implementing accreditation programs: a qualitative study of enabling factors. *BMC Health Services Research* 13:437.

Hodnik, R. (2012). Positive feedback: How ES departments can improve their HCAHPS scores. *Health Facil Manage, 25*(10), 53-55.

Holte, T. A., Bjertnæs, Ø. A. and Stavem, K. (2005). Er det sammenheng mellom sykehusstørrelse og pasienterfaringer? (Is there a relationship between hospital size and patient experiences?) *Tidsskrift for Den Norske Lægeforening, 125*(12), 1685-88 (in Norwegian).

Høie, J., Hernes, D. and Hveem, K. (1973). Pasientenes syn på sykehusoppholdet. (Patients' view of hospital stay.) *Tidsskrift for den Norske Lægeforening*, *93*, 2293-2296 (in Norwegian).

Hort, K., Djasri, H., Utarini, A. (2013). Regulating the quality of healthcare: Lessons from hospital accreditation in Australia and Indonesia. *The Nossal Institute for Global Health, Working Paper Series*, 28. Retrieved from http://ni.unimelb.edu.au/__data/assets/pdf_file/0006/782115/WP_28.pdf.

Hosmer, D. W. and Lemeshow, S. (1989). Applied Logistic Regression. New York, New York: John Wiley and Sons, Inc.

Howie, J. G., D. J. Heaney, and M. Maxwell (1997), 'Measuring quality in general practice. Pilot study of a needs, process and outcome measure.', *Occas Pap R Coll Gen Pract*, (75), i-xii, 1.

Hurst, K. (1997). The nature and value of small and community hospital accreditation', *International Journal of Health Care Quality Assurance*. 10 (3), 94-106.

Idvall, E. (2002). Post-operative patients in severe pain but satisfied with pain relief. *Journal of Clinical Nursing, 11*(6), 841 – 842.

Institute of Medicine. (2001). Crossing the quality chasm: a new health system for the 21st century. Washington, DC: National Academy Press.

International Medical Travel Journal, June 2009, *UAE: Ministry of Health demands hospital accreditation,* available on the Internet at http://www.imtj.com/news/?EntryId82=133385 accessed 17th July 2011

Ito H, Iwasaki S, Nakano Y, Imanaka Y, Kawakita H, Gunji A. (1998). Direction of quality improvement activities of healthcare organisations in Japan. *International Journal for Quality in Health Care*. 10:361–363.

Jaafaripooyan, E., D. Agrizzi, and F. Akbari-Haghighi (2011). Healthcare accreditation systems: further perspectives on performance measures. *Int J Qual Health Care*, 23 (6), 645-56.

Jaap van den Heuvel, G. C. N., Ronald J.M.M. Does (2013), 'Measuring healthcare quality: the challenges', *International Journal of Health Care Quality Assurance*, 26 (3), 269-78

Jacobson, A. 2011. JCI Executive Briefings. *International Accreditation Programme Update and Preview 2012*. October 12. Abu Dhabi: Hilton Hotel.

Jagadeesan, R., *et al*. (2008). Use of a standardized patient satisfaction questionnaire to assess the quality of care provided by ophthalmology residents. *Ophthalmology*, 115 (4), 738-743.

Jackson, J. L., Chamberlin, J. and Kroenke, K. (2001). Predictors of patient satisfaction. *Social Science and Medicine*, *52*(4), 609-620.

Jaipaul CK, Rosenthal GE. (2003). Are older patients more satisfied with hospital care than younger patients? *J Gen Intern Med*. 18:23–30.

James, M., Hunt, K., (1996) Accreditation at What Cost? *Journal of Management in Medicine,* 10 (4), 49-56.

Janssen, C., *et al*. (2007), 'How to improve satisfaction with hospital stay of severely injured patients.', *Langenbecks Arch Surg*, 392 (6), 747-60.

Jenkinson C, Coulter A, Bruster S. (2002) The Picker Patient Experience Questionnaire: development and validation using data from inpatient surveys in five countries. *International Journal for Quality in Health Care*; 14:353-358.

Jenkinson, C., Coulter, A., Bruster, S., Richards, N. and Chandola, T. (2002). Patients' experiences and satisfaction with healthcare: Results of a questionnaire study of specific aspects of care. *Quality and Safety in HealthCare, 11*(4), 335-339.

Jha A.K., Prasopa-Plaizier N., Larizgoitia .I, Bates D.W. (2010 Patient safety research: an overview of the global evidence. *Qual Saf Health Care*, 19:42–47.

Johansson, P., Oléni, M. and Fridlund, B. (2002). Patient satisfaction with nursing care in the context of healthcare: A literature study. *Scandinavian Journal of Caring Science*, *16*(4), 337-344.

Joint Commission (available on the Internet at http://www.jcaho.org).

Joint Commission International (available on the Internet at http://www.jcrinc.com/).

Joint Commission International (2010). *Joint Commission International Accreditation: Getting Started.* 2nd ed. Oakbrook Terrace, IL, Joint Commission Resources.

Joint Commission International (2011). *Joint Commission International Standards for hospitals*. 4th ed. Oakbrook Terrace, IL, Joint Commission Resources.

Jovanovic, B. 2005. Hospital accreditation as method for assessing quality in healthcare. *Oncology*, 13, 156-7.

Juul AB, Gluud C, Wetterslev J, Callesen T, Jensen G, Kofoed-Enevoldsen A. DIPOM Group (2005). The effects of a randomised multi-centre trial and international accreditation on availability and quality of clinical guidelines. *Int J Health Care Qual Assur Inc Leadersh Health Serv*. 2005;18:321–8.

Pomey M. P., François P., Bertrand D. (2004). Accreditation: a tool for organizational change in hospitals? *International Journal of Health Care Quality Assurance*, 17 (3), 113-24.

Kanak, M. F., Titler, M., Shever, L., Fei, Q., Dochterman, J., and Picone, D. M. (2008). The effects of hospitalisation on multiple units. *Applied Nursing Research, 21*(1), 15-22.

Karvitz R. L. (1996) Patient expectations of medical care: an expanded formulation based on review of the literature. *Medical Care Research and Review*, 53(1), 3-27

Keating, N.L., Green, D.C., Kao, A.C., Gazmararian, J.A., Wu, V.Y. and Cleary, P.D. (2002). How are patients' specific ambulatory care experiences related to trust, satisfaction and considering changing physicians? *Journal of General Internal Medicine,* 17 (1), 79-81.

Kelly, A.M. (2000). Patient satisfaction with pain management does not correlate with initial or discharge versus pain score, verbal pain rating at discharge, or change in vas score in the emergency department. *Journal of Emergency Medicine*, 19 (1), 113-16.

Kleinbaum, DG, Kupper, LL, Muller, KE, Nisam, A (1998). Applied regression analysis and other multivariable methods. Pacific Grove, CA: Duxbury Press.

Keith, T. (2006). Multiple regression and beyond. Pearson Allyn and Bacon.

Kirsh EJ, Worwag EM, Sinner M *et al*. (2000). Using outcome data and patient satisfaction surveys to develop policies regarding minimum length of hospitalisation after radical prostatectomy. *Urology*. 56:101–6.

Kohn, L., Corrigan, J., and Donaldson, M. (1999). *To err is human: Building a safer health system.* Washington, DC: Institute of Medicine, National Academy Press.

Koutsoyiannis A. (1977) Theory of Economometrics: An Introductory Exposition of Econometric Methods. Macmillan.

Kroenke, K., Stump, T., Clark, D. O., Callahan, C. M. and McDonald C. J. (1999). Symptoms in hospitalized patients: Outcome and satisfaction with care. *The American Journal of Medicine, 107* (5)*,* 425-431.

Kurpas, D. and A. Steciwko (2005). [Patient satisfaction as the main indicator of primary care quality]. *Przegl Lek*, 62 (12), 1546-51.

Kutney-Lee, A., McHugh, M. D., Sloane, D. M., Cimiotti, J. P., Flynn, L., Neff, D. F. and Aiken, L. H. (2009). Nursing: A key to patient satisfaction. *Health Affairs*, *28*(4), 669- 674.

Laditka, S. B., *et al*. (2001). The doctor on the patient's turf: assessing patient satisfaction with physician home visit programs. *Home Health Care Serv Q*, 19 (4), 1-16.

Larrabee, J. H. and L. V. Bolden (2001). Defining patient-perceived quality of nursing care. *J Nurs Care Qual*, 16 (1), 34-60.

Larrabee, J.H., Ostrow, C.L., Withrow, M.L., Janney, M.A., Hobbs, G.R. Jr and Burant, C. (2004). Predictors of patient satisfaction with inpatient hospital nursing care. *Research in Nursing and Health*. 27(4), 254-68.

Larson, P. J. (1987). Comparison of cancer patients' and professional nurses' perceptions of important nurse caring behaviours. *Heart and Lung*, *16*(2), 187-193.

Lawson, B. and Wells-Thorpe, J. (2002). The effect of the hospital environment on the patient experience and health outcomes. *The Journal of Healthcare Design and Development, 33*(3), 27-32.

Leatherman, S., Berwick, D., IIes, D., Lewin, L.S., Davidoff, F., Nolan, T., Bisognano, M., (2003) The Business Case for Quality: Case Studies and An Analysis. *Health Affairs,* 22 (2), 17-30.

Lee, M., (2010) *The Pursuit of Accreditation in Children's Mental Health Care: Motivations Experience and Perceptions* UMI Dissertation Publishing. ProQuest LLC, 789 East Eisenhower Parkway P.O Box 1346.

Linder-Pelz, S. and M. M. Stewart (1986). Patient satisfaction with outpatient primary health care in a metropolitan medical center. *Am J Prev Med*, 2 (2), 89-96.

Linn, L. S. and Greenfield, S. (1982). Patient suffering and patient satisfaction among the chronically ill. *Medical Care*, *20*(4), 425-431.

Linn, L.S., DiMatteo, M.R., Chang, B.L., Cope, D.W. (1984), 'Consumer values and subsequent satisfaction ratings of physician behaviour', *Medical Care*, 22 (9) 804-12

Lipkin, M. and M. D. Schwartz (2000). I can't get no patient or practitioner satisfaction. *J Gen Intern Med*, 15 (2), 140-41.

Lis CG, Rodeghier M, Grutsch JF, Gupta D (2009). Distribution and determinants of patient satisfaction in oncology with a focus on health related quality of life. *BMC Health. Serv. Res*., 9: 190.

Litwin MS, Shpall AI, Dorey F (1997). Patient satisfaction with short stays for radical prostatectomy. *Urology* 49:898–905.

Lloyd, H., *et al*. (2014). Patient reports of the outcomes of treatment: a structured review of approaches. *Health Qual Life Outcomes*, 12 (1), 215-221.

Lochman, J. E. (1983). Factors related to patients' satisfaction with their medical care. *J Community Health*, 9 (2), 91-109.

Professor the Lord Darzi of Denham KBE. (2008) High Quality Care for All: NHS Next Stage Review Final Report. London: UK Department of Health, 1-92.

Lorish TR, Tanabe CT, Waller FT *et al*. (1998) Correlation between health outcome and length of hospital stay in lumbar microdiscectomy. *Spine*; 23:2195–2200.

Mallardi, V. (2005), '[The origin of informed consent].', *Acta Otorhinolaryngol Ital*, 25 (5), 312-27.

Mannion, R., Davies, H. and Marshall, M. (2005). Impact of star performance ratings in English acute hospital trusts. *Journal of Health Services Research Policy,* 10**,** 18-24.

Mansour, A.A., Al-Osimy, M.H. (1993), 'A study of satisfaction among primary healthcare patients in Saudi Arabia', *Journal of Community Health*, Vol. 18 No.3, pp.163-73.

March, S., E. Swart, and B. Robra (2006), '[Patient satisfaction with outpatient/short stay operations in a practice clinic].', *Gesundheitswesen*, 68 (6), 376-82.

Marcinowicz, L. and R. Grebowski (2005), '[Patient's satisfaction in the light of the Polish empirical studies--an attempt to elucidate a secret of high satisfaction with care].', *Pol Merkur Lekarski*, 18 (108), 663-66.

Mathison, S., (1988) Why triangulate? *Educational Researcher*.17, **2**, 13-17

Maxwell, J. A., & Loomis, D. M. (Eds.). (2003). *Mixed Methods Design: An Alternative Approach*. Thousand Oaks, CA: Sage.

Mayer, T. and R. J. Cates (1999), 'Service excellence in health care.', *JAMA*, 282 (13), 1281-83.

McDowall, D., McCleary, R., Meidinger, E.R. and Hay R.A. (1980). *Interrupted Time Series Analysis*. Newbury Park: Sage Publications.

McGee, J., *et al*. (1999), 'Making survey results easy to report to consumers: how reporting needs guided survey design in CAHPS. Consumer Assessment of Health Plans Study.', *Med Care*, 37 (3 Suppl), 32-40.

Mendenhall, W. and Sincich, T. (1993). *A second course in business statistics:Regression analysis*. (Fourth Edition). New York: Dellen - MacMellan.

Merkouris, A., Papathanassoglou, E. D. E. and Lemonidou, C. (2004). Evaluation of patient satisfaction with nursing care: Quantitative or qualitative approach? *International Journal of Nursing Studies, 41*(4), 355-367.

Miller, M.R., Pronovost, P., Donithan, M., Zeger, S., Zhan, C., Morlock, L., Meyer, G.S., (2005), Relationship between Performance Measurement and Accreditation: Implications for Quality of Care and Patient Safety *American Journal of Medical Quality*, 20 (5), 239-252.

Mitchell, E. S. (1986). Multiple triangulation: A methodology for nursing science. . *Advances in Nursing Science, 8*(3), 18-26.

Modell, S. 2009. Institutional research on performance measurement and management in the public sector accounting literature: a review and assessment. *Financial Accountability and Management,* 25**,** 277-303.

Mumford V, Greenfield D, Hinchcliff R, *et al*. (2013) Economic evaluation of Australian acute care accreditation (ACCREDIT-CBA (Acute): study protocol for a mixed-method research project. *BMJ Open,* 3: 2381.

Myers R. (1990). Classical and modern regression with applications (2nd edition). Boston, MA: Duxbury

Naidu, A., (2009) Factors affecting Patient Satisfaction and Healthcare Quality *International Journal of Health Care Quality Assurance*, 22 (4), 366-381.

Nathorst-Boos, J., *et al*. (2001), 'An evaluation of the QSP and the QPP: two methods for measuring patient satisfaction.' *Int J Qual Health Care*, 13 (3), 257-64.

Nguyen TPL, Lee TG, Empereur F, Briançon S. (2002) Satisfaction of patients hospitalized in Ho Chi Minh City, Vietnam. *Sante Publique*.14: 345–60.

Nicklin W. (2009) Accreditation Canada's Qmentum Programme: Continuing to Promote Quality Improvement – One Year after Implementation, International society for quality in healthcare. 26th International Conference. Oct 13–16. http://www.isqua.org/Uploads/Conference/Abstracts/Microsoft_PowerPoint_-_B4_ Wendy_Nicklin.pdf (24 June 2012, date last accessed).

Novaes H de M. (1995). Implementation of quality assurance in Latin American and Caribbean Hospitals through standards and indicators. In: *Applicability of different quality assurance methodologies in developing countries. Proceedings of a pre-ISQua meeting, St Johns, Newfoundland, Canada, 29–30 May*. Geneva, World Health Organisation, 1996 (document WHO/SHS/DHS/96.2; available on the Internet at http://whqlibdoc.who.int/hq/1996/WHOSHSDHS96.2.pdf).

Nunally, J. and Berstein, I.(1994), *Psychometric Theory,* McGraw Hill, New York, NY

Organisation for Economic Cooperation and Development (OECD). (2010). ***Health at a Glance Europe 2010*** Retrieved July, 9, 2011, from ec.europa.eu/health/reports/docs/health_glance_en.pdf.

Osborne, J., & Waters, E. (2002). Four assumptions of multiple regression that researchers should always test. *Practical Assessment, Research & Evaluation*, 8(2)

O'Cathain, A., E. Murphy, and J. Nicholl (2010), 'Three techniques for integrating data in mixed methods studies', *BMJ*, 341 (17), 4587-4592.

O'Connor E, Fortune T, Doran J, *et al*. (2007). Involving consumers in accreditation: the Irish experience. *Int J Qual Health Care*. 19:296-300.

O'Farrell P. (1986) Entrepreneurs and industrial change. Irish Management Institute. Dublin

O'Malley AJ, Zaslavsky AM, Elliott MN *et al*., (2005) Case-mix adjustment of the CAHPS hospital surveys. *Health Serve Res* 40:2162–81.

O'Malley, A. J., *et al*. (2005), Exploratory factor analyses of the CAHPS Hospital Pilot Survey responses across and within medical, surgical, and obstetric services, *Health Serv Res*, 40 (6), 2078-95.

Otani, K. and Kurz, R. S. (2004). The impact of nursing care and other healthcare attributes on hospitalized patient satisfaction and behavioral intentions including commentary by Barney SM. *Journal of Healthcare Management, 49*(3),181-197.

Otani, K., Waterman, B., Faulkner, K. M., Boslaugh, S., Burroughs, T. E. and Claiborne, W. D. (2009). Patient satisfaction: Focusing on 'excellent'. *Journal of Healthcare Management*, *54*(2), 93-103.

Otani, K., Waterman, B., Faulkner, K. M., Boslaugh, S. and Claiborne, W. D. (2010). How patient reactions to hospital care attributes affect the evaluation of overall quality of care, willingness to recommend, and willingness to return. *Journal of Healthcare Management, 55*(1), 25-37.

Øvretveit, J. (2001), Quality evaluation and indicator comparison in healthcare. *Int. J. Health Plann. Mgmt*., 16: 229–241.

Øvretveit, J., Gustafson, D., (2002) Evaluation of Quality Improvement Programmes *Quality Health Care*, 11, 270-275.

Øvretveit J, Gustafson D. (2003). Improving the quality of healthcare: Using research to inform quality programmes. *BMJ.* 326:759-61.

Øvretveit J. (2005). Which interventions are effective for improving patient safety? A review of research evidence. Stockholm, Sweden: Karolinska Institute, Medical Management Centre.

Papanikolaou, V. and Ntani, S. (2008). Addressing the paradoxes of satisfaction with hospital care. *International Journal of Health Care Quality Assurance, 21*(6), 548-561.

Pape U. J, Millett C, Lee J T, Car J and Majeed A, (2013) Disentangling secular trends and policy impacts in health studies: use of interrupted time series *J R Soc Med.* 106: 124

Park, J. H. (2011), Understanding of the new Korea Healthcare Accreditation System, *J Korean Med Assoc*, 54 (2), 142.

Patrick, D., Scrivens, E., Charlton, J. (1983), Disability and patient satisfaction with medical care, *Medical Care*, 21 (11), 1062-75.

Peck, B. M., *et al*. (2001), Measuring patient expectations: does the instrument affect satisfaction or expectations? *Med Care*, 39 (1), 100-08.

Pedhazur, E. J. (1997). *Multiple Regression in Behavioral Research: Explanation and Prediction.* (3rd Ed) Orlando: FL. Harcourt Brace

Penchansky R and McNee C., (1994). Initiation of medical malpractice suits: a conceptualisation and test. *Med Care* 32(8), 813-31

Pomey, M.P., Contandriopoulos, A.P., François P. and Bertrand, D., (2004) Accreditation: A Tool for Organisational Change in Hospitals? *International Journal of Health Care Quality Assurance,* 17 (3), 113-124.

Pomey, M-P., François, P., Contandriopoulos, A.P., Tosh, A. and Bertrand, D. (February 2005). Paradoxes of French accreditation. *Quality and Safety in Health Care,* 14: 51 – 55.

Pearse J., (2005), 'Review of patient satisfaction and experience surveys conducted for public hospitals in Australia', *Steering Committee for the Review of Government Service Provision.*, 1.

World Health Organisation (1996). Quality assurance in laboratory practices. New Delhi, Regional office for South-East Asia, (document SEA/HLM 296; available on the Internet at http://whqlibdoc.who.int/searo/1994-99/SEA_HLM_296.pdf).

World Health Organisation, (2003). Quality and accreditation in healthcare services A Global Review, Evidence and Information for Policy, Department of Health Service Provision, **Geneva**.

Rahmqvist, M. (2001), 'Patient Satisfaction in relation to age, health status and other background factors: a model for comparisons of care units', *International Journal for Quality in Health Care*, 13 (5), 385-90.

Rahmqvist M. (2004). Quality in healthcare from the patient's perspective: variation in marking for different patient groups and between healthcare units. [Kvalitet i va˚rden ur patientens perspektiv: Variationer i betyg mellan olika patientgrupper och va˚rdenheter. Department of Medical and Health] (in Swedish). Linko¨pings Universitet, CMT Report 3.

Ranson MK, Sinha T, Morris SS, Mills AJ. (2006) CRTs—cluster randomised trials or ''courting real troubles'': challenges of running a CRT in rural Gujarat, India. *Canadian Journal of Public Health* 97: 72–5.

Ratcliffe, R. L. (2009), 'Re-engineering hospital accreditation', *Clinical Governance: An International Journal*, 14 (4), 315-35.

Ratcliffe, R.L., (2009) North American Perspectives: Re-engineering Hospital Accreditation *Clinical Governance: An International Journal,* 14 (4), 315-335.

Rawlins, R. 2001. Hospital accreditation is important. *BMJ,* 322**,** 674.

Rehm, J. and Gmel, G. (2001). Aggregate time series regression in the field of alcohol. *Addiction*, **96**: 945-954.

Robert Wood Johnson Foundation (2007). Communicating about 'Quality' in healthcare.

Rosenheck R, Wilson NJ, Meterko M. (1997). Influence of patient and hospital factors on consumer satisfaction with inpatient mental health treatment. *Psychiatr Serv* ,48:1553–61.

Rubin, HR, Ware JE, Nelson, EC, Meterko M. (1990). The Patient Judgement of Hospital Quality Questionnaire, *Med Care* 28(9), Special Supplement.

Runciman B, Merry A, Walton M. (2007). Safety and ethics in healthcare: a guide to getting it right. Aldershot: Ashgate.

Runciman WB, Williamson JAH, Deakin A, *et al*. (2006). An integrated framework for safety, quality and risk management: an information and incident management system based on a universal patient safety classification. *Qual Saf Health Care*.15 (Suppl 1):82-90.

Renzi, C., *et al*. (2001), Factors associated with patient satisfaction with care among dermatological outpatients, *Br J Dermatol*, 145 (4), 617-23.

Rubin, H. R., *et al*. (1997), Patient's view of dialysis care: development of a taxonomy and rating of importance of different aspects of care. CHOICE study. Choices for Healthy Outcomes in Caring for ESRD. *Am J Kidney Dis*, 30 (6), 793-801.

Rutherford, G. W., *et al*. (2010), Public health triangulation: approach and application to synthesizing data to understand national and local HIV epidemics, *BMC Public Health*, 10 (1), 447.

Sack, C., Lütkes, P., Günther, W., Erbel, R., Jöckel, K., Holtmann, G., (2010) Challenging the Holy Grail of Hospital Accreditation: A Cross-sectional Study of Inpatient Satisfaction in the Field of Cardiology, *BMC Health Services Research*, 10 (120)

Saeed, A.A., Mohammed, B.A., Magzoub, M.E., Al-Doghaither, A.H. (2001), Satisfaction and correlates of patients' satisfaction with physicians' services in primary healthcare centres, *Saudi Medical Journal*, 22 (3), 262–7

Safran, D.G., Taira, D.A., Rogers, W.H., Kosinski, M., Ware, J.E. and Tarlov, A.R. (1998), Linking primary care performance to outcomes data, *Journal of Family Practice*, 47 (2), 213-20.

Salmon, J.W., Heavens, J., Lombard, C., Tavrow, P., Heiby, J.R., Whittaker, S., Muller, M., Keegan, M., Rooney, A.L., (2003) Quality Assurance Project II: A Randomised Controlled Trial of a Hospital Accreditation Programme with Commentaries and Foreword: South Africa *Operations Research Results,* 2 (17).

Schmaltz, S. P., *et al*. (2011), Hospital performance trends on national quality measures and the association with Ioint Commission accreditation. *J Hosp Med*, 6 (8), 454-61

Scholle, S. H., *et al*. (2004), The development and validation of the primary care satisfaction survey for women. *Womens Health Issues*, 14 (2), 35-50.

Schmidt, L. A. (2004). Patients' perception of nurse staffing, nursing care, adverse events, and overall satisfaction with the hospital experience. *Nursing economics, 22*(6), 295-306.

Schwartz, A., *et al.* (2006), Patient-physician fit: an exploratory study of a multidimensional instrument. *Med Decis Making*, 26 (2), 122-33.

Scrivens E, Klein R, Steiner A. (1995). Accreditation: what can we learn from the Anglophone model? *Health Policy*. 34:193-204.

Scrivens E. (1997). Assessing the value of accreditation systems. *Eur J Public Health*. 7:4-8.

Selbmann HK. (2004). [Assessment and accreditation of hospital care in Germany]. Bundesgesundheitsblatt Gesundheitsforschung Gesundheitsschutz.47:103–10.

Sequist *et al*., (2008) Quality monitoring of physicians: linking experiences of care to clinical quality and outcomes. *J Gen Intern Med.*

Shadish, W. R., Cook, T.D., Campbell, D.T. (2002) Experimental and Quasi-Experimental Designs for Generalised Causal Inference. Boston, Houghton Mifflin Company.

Shaw, C. D. and Brooks, T. E. (1991). Health service accreditation in the UK. *Int J QualHealth Care,* 3**,** 133-140.

Shaw CD. (2000). External quality mechanisms for healthcare: summary of the ExPeRT project on visitation, accreditation, EFQM and ISO assessment in European Union countries. External Peer Review Techniques. European Foundation for Quality Management. International Organisation for Standardisation. *Int J Qual Health Care*. 12:169-75

Shaw, C.D, (2003a) Evaluating Accreditation *International Journal for Quality in Health Care,* 15 (6), 455-456

Shaw, C. D. (2003b). How can hospital performance be measured and monitored? Copenhagen: WHO Regional Office for Europe's Health Evidence Network (HEN).

Shaw, C. D. (2004a). Developing hospital accreditation in Europe. *In:* Division of country support (ed.). WHO Regional Office for Europe.

Shaw, C. D. (2004b). The external assessment of health services. *World Hospitals and Health Services,* 40**,** 24-7.

Shaw, C. D. (2004c). Toolkit for accreditation programmes: Some issues in the design and redesign of external healthcare assessment and improvement systems. Melbourne, Australia: International Society for Quality in Health Care.

Shaw, C. D. (2007). Which way to organisational excellence? Not this way; ask a professional. *Journal of the Royal Society of Medicine,* 100**,** 206-207.

Shaw, C. D., Kutryba, B., Braithwaite, J., Bedlicki, M. and Warunek, A. (2010). Sustainable healthcare accreditation: messages from Europe in 2009. *International Journal for Quality in Health Care,* 22**,** 341-350.

Shah, M. B., *et al*. (2005), Direct-to-consumer advertising and the patient-physician relationship. *Res Social Adm Pharm*, 1 (2), 211-30.

Shen, H-C., Chiu, H-T., Lee, P-H., Hu, Y-C. and Chang W-Y. (2011). Hospital environment, nurse-physician relationships and quality of care: Questionnaire survey. *Journal of Advanced Nursing, 67*(2), 349-358

Sitzia, J., *et al.* (1996), Patient satisfaction on a medical day ward: a comparison of nurse-led and physician-led services. *Int J Qual Health Care*, 8 (2), 175-85.

Sitzia, J. and Wood, N. (1997). Patient satisfaction: A review of issues and concepts. *Social Science and Medicine, 45*(12), 1829-1843.

Siebens K, Miljoen H, Fieuws S. *et al*. (2010) Implementation of the guidelines for the management of patients with chest pain through a critical pathway approach improves length of stay and patient satisfaction but not anxiety. *Crit Pathw Cardiol* 9:30–4.

Sitzia, J. and Wood, N. (1997). Patient satisfaction: A review of issues and concepts. *Social Science and Medicine, 45*(12), 1829-1843.

Sitzia, J. (1999). How valid and reliable are patient satisfaction data? An analysis of 195 studies. *International Journal for Quality in Health Care, 11*, 319-328.

Sixma H, Preeuwenberg P, van der Pasch M. (1998) Patient satisfaction with the General Practitioner: a two-level analysis. *Med Care*; 36: 212- 229.

Sizmur, S and Redding, D. (2009). Core domains for measuring inpatients' experience of care. Oxford: Picker Institute Europe

Smith, K. B., Humphreys J. S., and Jones J. A. (2006), Essential tips for measuring levels of consumer satisfaction with rural health service quality, *Rural Remote Health*, 6 (4), 594.

Smith, P. C., Mossialos, E. and Papanicolas, I. (2008). Performance measurement for health system improvement: experiences, challenges and prospects. World Health Organisation. European Observatory on Health Systems and Policies.

Sparks, T., Harlan, K., Caswell, L., Meiring, A., and Urban, C. (2000). Cruise to compliance. *Nursing Management, 31(4),* 18-21.

Stephen M. S. *et al*, (2005). An empirical assessment of high performing medical groups: Results from a national study. *Medical Care Research and Review*. Volume 62, Number 4, p407-34

Stephens, P.A., Buskirk, S.W., Hayward, G.D., and Martinez del Rio, C. (2005) Information theory and hypothesis testing: a call for pluralism. *Journal of Applied Ecology*, 42, 4-12.

Stevens, J. P. (2009). Applied multivariate statistics for the social sciences (5th ed.). New York, NY: Routledge.

Stewart MA., (1995). Effective physician- patient communication and health outcomes: a review. *CMAJ.* 152:1423-1433

Strasser S, Davis R. (1991) Measuring patient satisfaction. Ann Arbor, MI: Health Administration Press.

Stufflebeam, D. (2001). Evaluation models. *New directions for evaluation,* 7-98.

Suhonen, R., Välimäki, M.,Katajisto, J. and Leino-Kilpi, H. (2007). Hospitals' organisational variables and patients' perceptions of individualized nursing care in Finland. *Journal of Nursing Management, 15*(2), 197-206.

Sun BC, Adams J, Orav EJ *et al*. (2000). Determinants of patient satisfaction and willingness to return with emergency care. *Ann Emerg Med*. 35:426–34.

Sunol, R., Nicklin, W., Bruneau, C. and Whittaker, S. (2009a). Promoting research into healthcare accreditation/external evaluation: advancing an ISQua initiative. *International Journal for Quality in Health Care*, 21, 27-28.

Sunol, R., Vallejo, P., Thompson, A., Lombarts, M., Shaw, C. and Klazinga, N. (2009b). Impact of quality strategies on hospital outputs. *Quality and Safety in Health Care,* 18, 62-68.

Sulmasy, D. P. and J. M. McIlvane (2002), Patients' ratings of quality and satisfaction with care at the end of life. *Arch Intern Med*, 162 (18), 2098-104.

Sutherland, H. J., *et al*. (1989), Measuring satisfaction with health care: a comparison of single with paired rating strategies. *Soc Sci Med*, 28 (1), 53-58.

Tarlov AR, Ware JEJ, Greenfield S *et al*. (1989) The Medical Outcomes Study. An application of methods for monitoring the results of medical care. *J Am Med Assoc*; 262: 925–930.

Teutsch, C. (2003), Patient-doctor communication. *Med Clin North Am*, 87 (5), 1115-45.

The Joint Commission. Facts About Hospital Accreditation, http://www.jointcommission.org/assets/1/18/Hospital_Accreditation_1_31_11.pdf (26 June 2012, date last accessed).

Thi, P. L. N., Briancon, S., Empereur, F. and Guillemin, F. (2002). Factors determining inpatient satisfaction with care. *Social Science and Medicine*, *54*(4), 493-504.

Thompson DA, Yarnold PR, Williams DR *et al*. (1996) Effects of actual waiting time, perceived waiting time, information delivery, and expressive quality on patient satisfaction in the emergency department. *Ann Emerg Med*, 6:657 – 65.

Thomson, R., McElroy, H., Kazandijan, V.A., (1997) Maryland Hospital Quality Indicator Project in the United Kingdom: An Approach for Promoting Continuous Quality Improvement *Quality in Health Care,* 6, 49-55

Thompson, E., Pool, S., Brown, D., Clark, J., Ford, D., Gillett, C., Hansen, J., Koehler, S., Miller, S., Nadeau, S., Wilson, K., and Zastrow, S.. (2008). JCAHO Preparation: An Educational Plan. *The Journal of Continuing Education in Nursing, 39(5), 225-7*

Thorsteinsson, L.S. (2002), 'The quality of nursing care as perceived by individuals with chronic illnesses: the magical touch of nursing', *Journal of Clinical Nursing*, 11 (1), 32-40.

Tokunaga, J. and Imanaka, Y. (2002). Influence of length of stay on patient satisfaction with hospital care in Japan. *International Journal for Quality in Health Care, 14*(6), 493-502.

US Department of Health and Human Services. (2008) Development of a plan to transition to a Medicare value-based purchasing programme for physician and other professional services. Issue Paper. December.

UK Department of Health. (2009). Helping the NHS Put Patients at the Heart of Care: The Patient and Public Engagement Support Programme 2009-2010. London: Department of Health,

van Campen, C., *et al.* (1995), 'Quality of care and patient satisfaction: a review of measuring instruments.', *Med Care Res Rev*, 52 (1), 109-33.

Van Den Bos, J., *et al.* (2011), 'The $17.1 billion problem: the annual cost of measurable medical errors.', *Health Aff (Millwood)*, 30 (4), 596-603. (2013) Hospital accreditation, reimbursement and case mix: links and insights for contractual systems.

van der Waal, M. A., Casparie A. F., and Lako C. J. (1996), 'Quality of care: a comparison of preferences between medical specialists and patients with chronic diseases.', *Soc Sci Med*, 42 (5), 643-49.

Verbeek, J., *et al.* (2001), 'Consumer satisfaction with occupational health services: should it be measured?', *Occup Environ Med*, 58 (4), 272-78.

Vuori, H. (1987), 'Patient satisfaction--an attribute or indicator of the quality of care?', *QRB Qual Rev Bull*, 13 (3), 106-08.

Wagner, D. and Bear, M. (2009). Patient satisfaction with nursing care: A concept analysis within a nursing framework. *Journal of Advanced Nursing, 65*(3), 692-701.

Ware, J. E., Davies-Avery, A. and Stewart, A. l. (1978). The measurement and meaning of patient satisfaction. *Health and Medical Care Service Review, 1*(1), 3-15.

Wensing, M., Jung, H. P., Mainz, J., Olesen, F. and Grol, R. (1998). A systematic review of the literature on patient priorities for general practice care. Part 1: Description of the research domain, *Social Science and Medicine*, *47*(10), 1573- 1588.

Weiss, G.L. (1988), 'Patient satisfaction with primary medical care: evaluation of sociodemographic and predisposing factors', *Medical Care*, 26 (4), 383-92.

Westaway, M., Rheeder, P., van Zyl, D. G. and Seager, J. R. (2003). Interpersonal and organisational dimensions of patient satisfaction: The moderating effects of health status. *International Journal of Quality in Health Care, 15*(4), 337-344.

Wensing, M., et al. (1998), 'A systematic review of the literature on patient priorities for general practice care. Part 1: Description of the research domain.', *Soc Sci Med*, 47 (10), 1573-88.

Whitworth J, Pickering H, Mulwanyi F, Ruberantwari A, Dolin P, Johnson G. (1999) Determinants of attendence and patient satisfaction at eye clinics in South Western Uganda. *Health Policy Plan*; 14: 77-81.

Wilde Larsson, B., Larsson, G. and Starrin, B. (1999). Patients' views on quality of care: A comparison of men and women. *Journal of Nursing Management, 7*(3), 133-139.

Williams, S. *et al*. (1998) Doctor-patient communication and patient satisfaction: a review. *Family Practice*; 15: 480-92.

Wolosin, R., Ayala, L., and Fulton, B. (2012). Nursing care, inpatient satisfaction, and value- based purchasing. *Journal of Nursing Administration, 42*(6), 321-325.

Wagner AK, Soumerai SB, Zhang F, Ross-Degnan D. (2002) Segmented regression analysis of interrupted time series studies in medication use research. *J Clin Pharm Ther*; 27: 299-309.

Walker, R.H., Johnson, L.W., (2009) Signaling Intrinsic Service Quality and Value via Accreditation and Certification *Managing Service Quality*, 19 (1), 85-105

Walshe, K. (2002). The rise of regulation in the NHS. *BMJ,* 324**,** 967.

Walshe, K. (2003). *Regulating healthcare: a prescription for improvement?,* Maidenhead, Philadelphia, Open University Press.

Walshe, K. (2007). Understanding what works--and why--in quality improvement: the need for theory-driven evaluation. *International Journal for Quality in Health Care,* 19**,** 57-59.

Walshe, K. (2009). Pseudoinnovation: the development and spread of healthcare quality improvement methodologies. *International Journal for Quality in Health Care,* 21**,** 153-159.

Walshe, K. and Shortell, S. M. (2004). Social regulation of healthcare organisations in the United States: developing a framework for evaluation. *Health Services Management Research,* 17**,** 79-99.

Walshe, K. and Smith, J. (2006). *Healthcare Management,* London: Open University Press, McGraw Hill, UK.

Walshe, K., Wallace, L., Freeman, T., Latham, L. and Spurgeon, P. (2001). The external review of quality improvement in healthcare organisations: a qualitative study. *International Journal of Quality in Health Care,* 13**,** 367-374.
351

Walshe, K. and Walsh, N. (2000). Evaluating accreditaton programmes in healthcare. *In:* Walshe, K., Walsh, N., Schofeild, T. and Blackway-Philips, C. *Accreditation in Primary Care: towards clinical governance.* Oxon, England:Radcliffe Medical Press Ltd.

Waltson, S.L., Al-Omar, B.A., Al-Mutari, F.A., (2010) Factors Affecting the Climate of Hospital Patient Safety: A Study of Hospitals in Saudi Arabia *International Journal of Health Care Quality Assurance,* 23 (1), 35-50

Weiner, B.J., Alexander, J.A., Shortell, S.M., Baker, L.C., Becker, M., Geppert, J.J., (2006) Quality of Care: Quality of Improvement Implementation and Hospital Performance on Quality Indicators *Health Services Research,* 41 (2), 307-328

Weiss, B.D. and Senf, J.H (1990), Patient Satisfaction survey instrument for use in health maintainance organisations, *Med. Care*, 28 (5), 434-45

Wilson RM, Michel P, Olsen S, Gibberd RW, Vincent C, El-Assady R, Rasslan O, Qsous S, Macharia WM, Sahel A, *et al* (2012). Patient safety in developing countries: retrospective estimation of scale and nature of harm to patients in hospital. *BMJ*, 344:832.

Whittaker S *et al*. (2000). Status of healthcare quality review programme in South Africa. *International Journal for Quality in Health Care.* 3:247–250.

Whittaker S *et al*. (1998). Introducing quality assurance to health service delivery – some approaches from South Africa, Ghana and Kenya. *International Journal for Quality in Health Care*. 10:263–267.

WHO (2003). Quality and accreditation in healthcare services: A global review. Geneva: Department of Health Service Provision.

Woodhead, A. (2013), 'Scoping medical tourism and international hospital accreditation growth', *International Journal of Health Care Quality Assurance*, 26 (8), 688-702.

Yaffee R, with McGee M.(2000). Introduction to Time Series Analysis and Forecasting with Applications of SAS and SPSS. San Diego, Cal: Academic Press;.

Young A, Byles J, Dobson A. (1998) Women's satisfaction with general practice consultations. *Med J Aust*; 168: 383- 389.

Young G, Meterko M, Desai K. (2000) Patient satisfaction with hospital care: effects of demographic and institutional characteristics. *Med Care* 38:325–34.

Valentine, N., McKay, M., and Glassford, B. (2009). Getting ready for your next patient: embedding quality into nursing practice. *Nurse Leader,* 7(3), 39-43.

Velicer WF, Colby SM. (2005) A Comparison of Missing-Data Procedures for Arima Time-Series Analysis. *Educ Psychol Meas*, 65:596-615.

Zebiene, E., et al. (2004), 'Meeting patient's expectations in primary care consultations in Lithuania.', *Int J Qual Health Care*, 16 (1), 83-89.

Zeger SL, Irizarry R, Peng RD.(2006) On time series analysis of public health and biomedical data. *Annu Rev Public Health*; 27: 57-79.

Zhang F., Wagner A. K., Ross-Degnan D. (2011). Simulation-based power calculation for designing interrupted time series analyses of health policy interventions. *Journal of Clinical Epidemiology,* 64, 1252-1261